DECLASSIFIED UNDER AUTHORITY OF THE
INTERAGENCY SECURITY CLASSIFICATION APPEALS PANEL,
E.O. 13526, SECTION 5.3(b)(3)

ISCAP APPEAL NO. 2009-068, document no. 97
DECLASSIFICATION DATE: February 25, 2015

SECRET

[redacted]

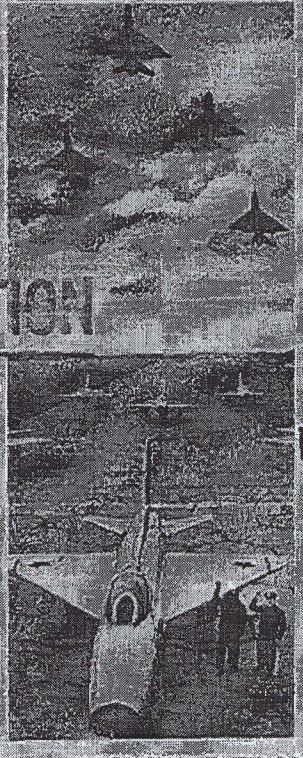
NORTH AMERICAN AIR DEFENSE COMMAND

WIR

WEEKLY INTELLIGENCE REVIEW (U)

DOWNGRADED TO UNCLASSIFIED FOR
PUBLIC RELEASE BY
NORAD/USNORTHCOM/CSO
SEPTEMBER 2009

SCANNED BY ACD
2008



PRIVILEGED INFORMATION

SEE INSIDE COVER FOR SAFEGUARDING GUIDE

FOR OFFICIAL USE ONLY

RAND LIBRARY
REC'D. OCT 11 1965

MICROFILMED BY ADM

EXEMPTED FROM
DECLASSIFICATION IAW EO 12958
REVIEW DATE JUN 97 REVIEWER 64
REFER TO NORAD
EXEMPTION (S): 1 2 3 4 5 6 7 8 9

[redacted]

SPECIAL HANDLING REQUIRED
This document is releasable only
to U.S. and Canadian Nationals

EXCLUDED FROM AUTOMATIC
REGRADING, DOD DIRECTIVE 5200.10
DOES NOT APPLY
Group 1

WIR 41/65
8 Oct 1965

SECRET

OCT 11 1965
Postal Registry No. 2540 95

[redacted]

K410.602-242

0980707

41-65 8 Oct 1965 copy 1

SECRET

NORAD Weekly Intelligence Review

The WIR in Brief

Portion identified as non-responsive to the appeal

Portion identified as non-responsive to the appeal

Space

SOLAR CELL OUTPUT RAISED WITH CONCENTRATORS 7
Tested system for ground use, but might be adapted to space use.
COSMOS 91, 13th SOVIET PHOTORECCE SATELLITE THIS YEAR, DE-ORBITED 7
On Revolution 127.
RECENT INTERCEPTS OF SOVIET SPACE VEHICLE TRANSMISSIONS 8
7 vehicles known to be transmitting yet.
SPACE LISTING AND OVER-ALL SPACE STATUS REPORT 8
As of 10002, 5 October.
MOLNIYA I MAY HAVE LARGEST SOLAR-CELL SYSTEM EVER PLACED IN ORBIT 9
Output not known but might be as much as 1 kw.
7th VERTICAL LAUNCH OF 1965 FROM KAPUSTIN YAR 10
Six had 85-120 n. m. apogees.
LUNA 7 LAUNCHED 6 MINUTES AFTER OPTIMUM LAUNCH TIME 10
Probably a soft-lander.
SOVIET COSMONAUTS TO BEAT U.S. TO MOON, REPORTEDLY SAYS COSMONAUT KOMAROV 11

COVER: Scene at Soviet air base. (From Red Star) (OFFICIAL USE ONLY)

NOTE: Pages 26, 28, 29, 32, 33, 36, 37, 40, and 41 of this issue are blank.

RETURN TO SAF/IC MAXWELL FB AL 36112-5

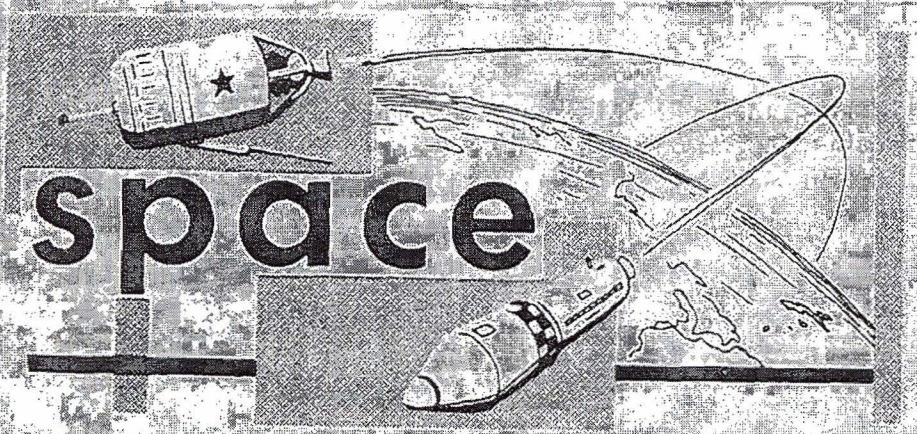
MEMORANDUM BY ADM

FOR OFFICIAL USE ONLY

SECRET

E.O. 13526, 3.3(b)(1)>25Yrs

00880707



significant intelligence on space developments and trends

Solar-Cell Output Raised with Concentrators

The power output of solar cells can be raised 7 times through a 12-fold increase in the amount of solar energy falling on the cells, according to the published results of a Soviet study conducted in Tashkent, USSR. The delivery of more solar energy to the cells was accomplished by means of solar concentrators. The 12-fold increase in solar energy may represent a maximum for silicon solar cells, since more energy would raise the temperature of the cells to destructive levels. A water-cooling system was used in the Tashkent experiments to maintain cell temperatures at 60-70 C. (140-158 degrees F.).

The system tested would appear to be usable only on the ground in view of the weight penalties of the concentrator and cooling system, but the principle might be applied to space systems by using a lightweight concentrator and solar cells which can operate at high temperatures. Gallium arsenide has been mentioned frequently as a potential material for high-temperature solar cells, although presently it is not as efficient for the purpose as silicon.

(FTD)

~~(CONFIDENTIAL~~ NO FOREIGN DISSEMINATION -- Releasable to NATO, Aus & NZ)

Cosmos 91, 13th Soviet Photorecce Satellite this Year, Recovered

Cosmos 91, which the Soviets launched from Tyuratam at about 0900Z, 23 September 1965, was deorbited on Revolution 127, impacting in the USSR at about 0705-0710Z, 1 October, after nearly 8 days in orbit. Of the 25 Soviet photoreconnaissance satellites (including Cosmos 91) launched in 1964 and 1965, 23 were brought down after about 8 days in orbit. (See chart on page 39.)

(SPADATS, NORAD)

~~(SECRET~~ NO FOREIGN DISSEMINATION -- Releasable to US, UK & Canada)

Recent Intercepts of Soviet Space Vehicle Transmissions

Following is a listing of recently reported intercepts of transmissions from Soviet space vehicles which are still in orbit and which may still be active:

Vehicle	Date of Launch	Signal Characteristics	Date of Most Recent Intercept
Molniya 1	23 Apr 65		
Cosmos 71	16 Jul 65		
Cosmos 72	16 Jul 65		
Cosmos 73	16 Jul 65		
Cosmos 75	16 Jul 65		
Proton 1	16 Jul 65		
Cosmos 76	23 Jul 65		

50X1 and 3, E.O.13526

(Various ELINT sensors)
(~~SECRET~~ NO FOREIGN DISSEMINATION -- Releasable to US, UK & Can)

Space Listing and Over-All Space Status Report

The over-all space-vehicle status as of 1000Z, 5 October 1965, was as follows:

	US	UK	Can	Italy	USSR	Totals
Payloads orbiting Earth	153	2	1		38	194
Payloads orbiting Sun	8				8	16
Payloads impacted on Moon	5				2	7
Payloads en route to Moon					1	1
Debris orbiting Earth	390	1	2		137	530
Debris orbiting Sun	8					8
TOTALS	564	3	3		186	756

	US	UK	Can	Italy	USSR	Totals
Payloads decayed or de-orbited	156			1	87	244
Debris decayed	119	1			494	613
TOTALS	839	3	3	1	767	1613

A listing of Soviet payloads still orbiting the Earth as of 1 October 1965 is shown on page 42
(SPADATS)
(OFFICIAL USE ONLY)

Molniya 1 May Have Largest Solar-Cell System Ever Placed in Orbit

Molniya 1, the Soviets' first operational communications satellite, may be carrying the largest solar-cell power system ever placed in orbit. Not enough information is available to make a confident estimate of its power output, but the figure may be almost 1 kilowatt.

A sketch of Molniya 1 which appeared in the Soviet Communist Party newspaper Pravda showed 6 solar panels radiating out from a circular center section like spokes from a wagon wheel. The 6 panels and the end of the center section appeared to be completely covered with solar cells. (Drawing on page 38.)

Each of the 6 panels appeared to be hinged to the center section and hinged in the middle so that the panels could be folded in half and parallel to the main body of the payload during launch. The aerodynamic fairing which covered the panels during launch was ejected in space, after which the solar panels were erected and kept continuously oriented to the Sun.

Molniya 1's batteries, which are charged by the solar cells and which supply electrical power when the satellite is in the Earth's shadow, should have a relatively long operating life. The number of charge/discharge cycles to which a battery is subjected is the main factor in determining battery life. The best chemical batteries available are usually limited to a few thousand such cycles. Because of its orbital parameters, Molniya 1 is in the Earth's shadow only twice daily and then only for brief periods of time, in contrast with many satellites which enter the Earth's shadow up to 16 times daily.

Another possible limiting factor of the over-all system is the lifetime of the solar cells. Their operating lifetime can be shortened by excessive heat and radiation of the space environment.

A Predecessor? A power-supply system similar, if not identical, to that of

Molniya 1 was probably carried by Cosmos 41. The Soviets launched Cosmos 41 on 22 August 1964 into an orbit very similar to that of Molniya 1 but very much different from that of any other Soviet satellite. Launched shortly before the Olympic Games, Cosmos 41 may have been the Soviets' first attempt to launch a communications satellite of the Molniya type. The Soviets probably intended to use it as a relay for broadcasting TV coverage of the Games to the USSR's domestic TV net, to Intervision (TV net of the Communist nations of Eastern Europe), and to Eurovision (TV net of Western Europe).

Cosmos 41, however, apparently was a failure. Unlike Molniya 1, no signals were ever intercepted from it. The Soviets covered it up with an announcement that the satellite was a Cosmos-type vehicle conducting research of the space environment.

(FTD; NORAD)

~~(SECRET~~ NO FOREIGN DISSEMINATION -- Releasable to NATO, Aus & NZ)

7th Vertical Launch of 1965 from Kapustin Yar

The Soviets launched a vehicle vertically from Kapustin Yar at about 2003Z, 23 September. The 7th Soviet launch of this type this year, this firing probably continues a test program which began 8 June 1965. Six of the firings had apogees of 85-120 n.m. (8 Jun, 4 Aug, 3 Sep, 9 Sep, 17 Sep, and 23 Sep); the vehicle launched 20 September had an apogee of 270-290 n.m., characteristic of geophysical vehicles launched in 1963.

The exact purpose of the 85-120 n.m. launches is unknown but is believed to be related to the space program.

(FTD)

~~(SECRET)~~

Luna 7 Launched 6 Minutes After Optimum Launch Time

The Soviets launched lunar probe Luna 7 from Tyuratam at about 0737Z, 4 October, or about 6 minutes after the estimated optimum launch time of 0731 (p. 10, WIR 39/65). If it is a lunar soft-lander, as estimated (but not announced yet by the Soviets), Luna 7 should impact on the Moon at roughly 1730Z, 7 October.

The parking orbit into which Luna 7 was injected before it was sent into transfer trajectory toward the Moon was normal for a Soviet space probe:

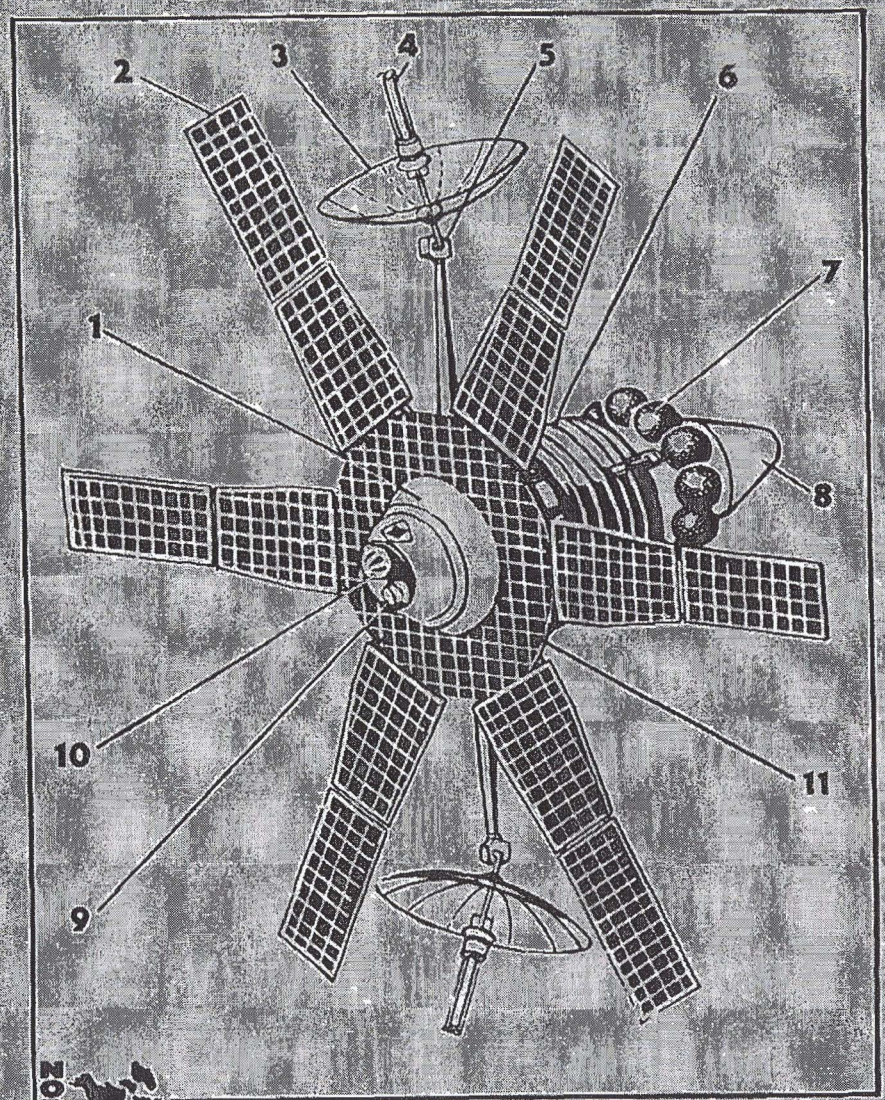
Inclination	64.7 degrees
Period	88.5 minutes
Apogee	246.7 kilometers (132 n.m.)
Perigee	179.0 kilometers (95.5 n.m.)

This is the Soviets' 16th lunar probe attempt, their 10th or 11th attempt to make a soft landing. (See WIR 25/65 for a summary of the results of these attempts.)
(SPADATS; NORAD)
~~(SECRET~~ NO FOREIGN DISSEMINATION -- Releasable to US, UK & Canada)

Soviet Cosmonauts to Beat US to Moon, Reportedly Says Cosmonaut Komarov

An article entitled "The Moon Awaits Us," by Engineer-Lt Col V. Vishyakov in the August 1965 issue of the Soviet NCO periodical "Senior Sergeant," said that, at a meeting of 3 Soviet cosmonauts with a Czechoslovak journalist, Komarov said that Soviet cosmonauts will fly to the Moon when a safe return to Earth can be assured. When asked if the flight would take place in this decade, Komarov answered, "The US, as you say, has proposed the formula, '1969 plus X.' In that case, our formula is '1969 plus (X minus 1)'."
(CIA)
~~(CONFIDENTIAL)~~

Molniya 1 -- Soviet Communications Satellite (launched 23 Apr 65)



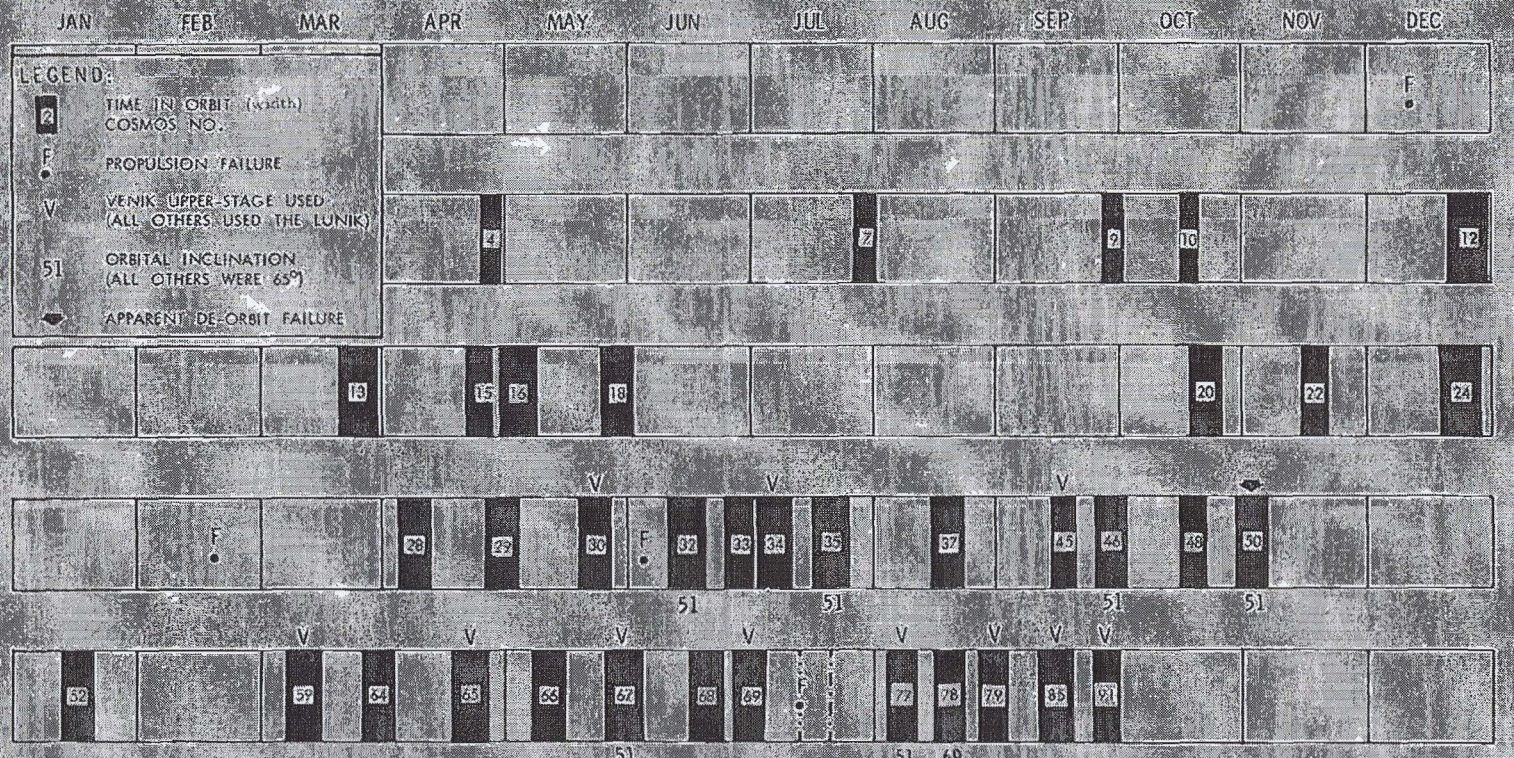
1. Airtight body.
2. Solar cells.
3. Narrow-angle parabolic antenna.
4. Earth-oriented antenna element.
5. Device to move antenna.
6. Radiator cooling device.
7. Fuel for correcting attitude.
8. Orientation correction motor.
9. Pick-up for orientation data.
10. Solar orientation pick-up.
11. Heating panel.

NORAD

WIR 41/65

OFFICIAL USE ONLY

Soviet Photoreconnaissance Satellites (most recoverable Cosmoses launched from Tyuratam)



All these vehicles were launched by the SS-6 ICBM booster-sustainer and injected into orbit by an upper stage. Launches were timed for optimum conditions for photography when passing over the US and southern Canada. Perigees were relatively low. Payloads were horizon-oriented.

All vehicles were de-orbited successfully (and film presumably recovered) except for Cosmos 50. Resolution of camera systems believed to be 20-30' for Lunik-injected payloads, which weigh about 10,000 pounds, and 5-8' for Venik injected payloads, which could weigh up to 15,000 pounds. Camera systems would occupy only fraction of payload, hence equipment for other missions could be carried. Soviets claim all Cosmoses are "scientific research" vehicles. Some have gathered radiation data.

Note infrequency and short duration of early launches and 4.5 month gap in mid-1963, after which systems probably became operational. Most 1964 and 1965 missions have lasted 8 days.

50X1 and 3, E.O.13526

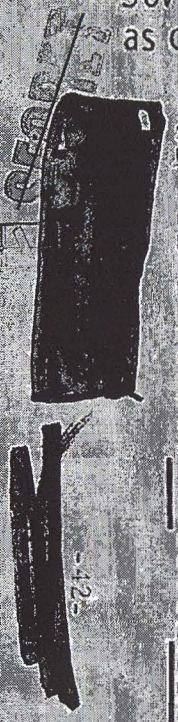
The Soviets apparently did not have a stand-by vehicle ready when the launch of 13 July failed

~~SECRET~~

NORAD

WIR 41/65

Soviet Vehicles in Earth Orbit as of 1200Z, 1 Oct 1965



Soviet Designation	Object No.	Date of Launch	Inclination to Equator (degrees)	Period (minutes)	Apogee (Kilometers #)	Perigee (Kilometers #)	Number of Revolutions	Estimated Life Expectancy or Decay Date
Polyot 1	683	01 Nov 63	58.94	102.2	1393.1	336.9	9853	Over 50 years
Electron 1	746	30 Jan 64	61.00	169.3	7104.2	411.4	5190	Over 50 years
Electron 2	748	30 Jan 64	58.58	1356.3	66966.3	1453.6	647	Over 50 years
Polyot 2	784	12 Apr 64	58.08	91.4	394.5	288.5	8413	3d Qr, 1967
Electron 3	829	10 Jul 64	60.87	168.1	7018.6	405.6	3833	Over 50 years
Electron 4	830	10 Jul 64	59.10	1313.8	65717.1	999.2	490	Over 50 years
Cosmos 41	869	22 Aug 64	66.06	714.4	39356.0	789.9	817	Over 50 years
Cosmos 42	864	22 Aug 64	48.88	92.9	601.1	213.2	6101	Feb 1966
Cosmos 43	867	22 Aug 64	48.93	93.0	602.6	218.8	6104	Feb 1966
Cosmos 44	876	28 Aug 64	65.09	99.5	874.0	598.0	5770	Over 50 years
Cosmos 51	947	09 Dec 64	48.83	90.4	355.8	228.0	4647	Dec 1965
Cosmos 53	983	30 Jan 65	48.71	96.5	965.2	210.0	3602	Oct 1966
Cosmos 54	1089	21 Feb 65	56.03	104.2	1649.9	259.8	3059	Over 10 years
Cosmos 55	1090	21 Feb 65	56.01	104.3	1659.6	262.3	3053	Over 5 years
Cosmos 56	1091	21 Feb 65	56.04	103.4	1578.2	258.3	3077	Over 5 years
Cosmos 58	1097	26 Feb 65	65.06	96.8	638.7	571.0	3233	Over 50 years
Cosmos 61	1267	15 Mar 65	56.01	104.2	1645.2	264.8	2753	Over 5 years
Cosmos 62	1268	15 Mar 65	56.03	104.2	1646.3	261.4	2758	Over 5 years
Cosmos 63	1269	15 Mar 65	56.02	103.4	1576.2	260.8	2773	Over 5 years
Molniya 1	1324	23 Apr 65	65.16	720.7	39849.4	648.7	323	Over 50 years
Cosmos 70	1431	02 Jul 65	48.75	97.8	1082.8	220.4	1340	1968
Cosmos 71	1441	16 Jul 65	56.05	95.3	546.4	516.6	1169	Over 50 years
Cosmos 72	1442	16 Jul 65	56.06	95.9	581.0	544.6	1161	Over 50 years
Cosmos 73	1443	16 Jul65	56.07	95.6	552.0	542.0	1165	Over 50 years
Cosmos 74	1444	16 Jul 65	56.04	96.2	609.6	545.7	1158	Over 50 years
Cosmos 75	1445	16 Jul 65	56.05	96.5	637.5	546.5	1154	Over 50 years
Proton 1	1466	16 Jul 65	63.45	89.6	328.4	164.8	1215	Oct 1965
Cosmos 76	1464	23 Jul 65	48.78	91.9	482.5	251.3	1100	2d Qr 1967
Cosmos 80	1570	03 Sep 65	56.06	115.0	1552.2	1355.8	349	Over 50 years
Cosmos 81	1571	03 Sep 65	56.06	115.3	1555.1	1386.3	348	Over 50 years
Cosmos 82	1572	03 Sep 65	56.06	115.7	1561.3	1411.3	347	Over 50 years
Cosmos 83	1573	03 Sep 65	56.06	116.1	1567.6	1439.3	346	Over 50 years
Cosmos 84	1574	03 Sep 65	56.05	116.4	1574.8	1466.3	345	Over 50 years
Cosmos 86	1584	18 Sep 65	56.06	115.1	1639.3	1277.2	165	Over 50 years
Cosmos 87	1585	18 Sep 65	56.06	115.5	1651.2	1301.9	164	Over 50 years
Cosmos 88	1586	18 Sep 65	56.07	115.8	1661.3	1326.0	163	Over 50 years
Cosmos 89	1587	18 Sep 65	56.05	116.2	1676.6	1347.7	163	Over 50 years
Cosmos 90	1588	18 Sep 65	56.05	116.7	1688.1	1373.9	162	Over 50 years

NORAD

WIR 41/65

OFFICIAL USE ONLY