

ASTP (USSR) MISSION SR147/1
Time: 08:30 CDT, 121:10 GET
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KIO This is the Soviet Mission Control Center. (Moscow time is 16 hours 30 minutes. Soyuz 19 is completing it's 82nd orbit of the Earth. Right now the spacecraft is approaching the equator on the Atlantic seacoast of South America. In accordance with the flight plan, the cosmonauts should be conducting operations connected with the experiment on the embryonic development of fish. I recall that they have completed their whole series of photographs of the solar corona. After that, the crew of Soyuz 19 will turn to preparations for regular comm session with the Moscow Control Center. And during the - that, regular obser - notation on their observations of the Growth of Micro-Organisms experiment. I'm still - There are 15 minutes remaining until Soyuz has AOS over Eupatoria. As before, it's located in - it's in the solar orientation mode - solar spin mode, I should say. This is Moscow Control Center.)

KIO (Soviet Mission Control Center. Moscow time - 16:41. 82nd orbit of the Soyuz 19. The craft's in - flight 121 hours and 21 minutes. The parameters of the forthcoming orbit: maximum height - 218 and 84, minimum, 211 and .69 kilometers. Time of orbit - 88.74 minutes. Inclination towards the equator - 51 at .78 degrees. According to the plan of the flight, crew - the flight engineer will be conducting - recording data on the experiment of biological - micrological experiments. Alexey Leonov is preparing for the upcoming comm session which will be held in 6 minutes. During this comm session there will be a TV report from onboard. This was Central - this was Moscow Mission Control Center.)

KIO (This is Soviet Mission Control Center. Soyuz 19 will enter AOS through Eupatoria.)

CC-M (Soyuz, this is Moscow.)

SCDR (Standing by.)

CC-M Soyuz, this is Moscow. (Phase 2, get pad 14.)

CC-M (Are you ready, Valeriy?)

SFE (Okay, I'm ready.)

CC-M Number (77. Orbit - 85; thrust - 057 ...)

SFE How much is the thrust?

CC-M (0576) for all revolutions; angular range - 0.87;

ACDS for all the orbits - 195. Further I read the orbit number, time of start, and angle. (Time of start - 19:30:20. The main engine works - 100, 098.)

SFE (Okay. Give it to me again.)

CC-M (86, 21, 03, 19. 87, 86, 22, 19, 28, 086 87th. Close the window please.)

CC-M (87, 23, 51, 29. 86 - 88, 01, 23, 31, 087. 90, 02, 55, 52, 087. 91st, 04, 29, 23, 086. 92nd, 06, 04, 22, 085. 92nd, 07, 12, 19, 086. 93rd, 08, 46, 08, 086. 95th, 10, 18, 29, 086. How did you read me?)

SFE (Read the third time.)

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CC-M (10, 18, 29. 10, 18, 29. 90 - 90, 02, 55, 52.)
SFE Give me confirmation.)
SFE (The start, 057, 85th. The confirmation of the data.)
CC-M (Okay, 77 confirmed.)
CC-M (How is everything going?)
SFE (Everything is going well. We completed the entire
program.)
CC-M (Okay. You did quite a bit of work - amount work.
Our data, it seems that you are tied on the basis - on information we
received. Okay. Why don't you take some medicine - tablets.)
SFE (Last time I was at the sensors I was - and my - the
control was not hooked up - connected.)
CC-M (Okay, I understand you.)
SFE (Okay. Everything is going normal.)
CC-M (Okay, why don't you sit quietly for a few minutes
while they can record them?)
SFE (Okay. I'll connect the - Okay, now we're both hooked
up.)

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USSR (Okay. Everything is doing - going normal.)
CC-M (Okay why don't you sit quietly for a few minutes while they can record them?)
CC-M (Okay.)
USSR (I'll connect the - okay, now we're both hooked up.)
CC-M (That's a beautiful color picture we have here.)
USSR (Okay. Is the medical recording going on?)
CC-M (Yes, it is.)
CC-M (Alex, write this down.)
CC-M (Take a pencil.)
SFE (Okay.) It sounds so complicated.
CC-M Pamangin.
SFE How much?
CC-M (Take some - take an - its two tables in book number 1. Russian medicine Pamangin.)
USSR (I don't feel any fatigue. Everything is normal. I don't have a headache. My pulse is normal.)
CC-M (Well, this is just a precaution. You have a rather difficult day and a difficult step lying ahead of you. Just try to relax.)
CC-M (Okay. The medical record - recording has been completed. Now you can start moving. We have a minute and a half left.)
USSR (So how's - okay, - what - has - Is there anything new?)
CC-M (No, nothing new.)
USSR (Can we assemble the TV camera?)
CC-M (Just one second; I'll tell you.)
CC-M (Okay. Yes, you may.)
USSR (Roger.)
CC-M (20 seconds left. Successful flight until we met again next orbit.)
KIO (Soviet Mission Control Center. Moscow time, 17:14. A couple of minutes ago, regularly scheduled comm session was held with Soyuz 19 with Mission Control. Provi - Receiving the telemetry data. There are no comments regarding the onboard systems. Regarding the health of the cosmonauts, everything is normal. 67 was the pulse of Leonov, and Kubasov's is 68 per minute. 18 is the breath rate of Leonov; 20 of Kubasov. Telemetry data in descent vehicle is 630; in OM, 6 - Temperature is 18; orbital module, 19.7 ... This is the halfway ... in the - in this orbit. The craft is approaching the equator. The following is the program for the 83rd orbit. The cosmonauts will now begin their dinner. At the end of the orbit, they will summarize the work that they have done the first 6 days of their flight. This was Mission Control Center, Moscow.)
KIO (This is Soviet Mission Control. Moscow time is 17 hours 45 minutes. The 83rd orbit of the spacecraft Soyuz is continuing. The spacecraft, as before, is oriented towards the Sun with an angular velocity of 3 degrees per second over the Atlantic Ocean. The 83rd orbit is being completed. According to the flight program, the cosmonauts are scheduled to be finishing their dinner. Today's menu of the cosmonauts: Alexey Leonov's menu: "Kharcho" soup, bread, turkey with - bread and black currants with sugar. Kubasov's: "shchee", green shchee [cabbage soup],

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chicken meat, bread, black currant juice with sugar, and plums with nuts. Until the next comm session between the spacecraft and the Mission Control Center there is 35 minutes. The session will take place when spacecraft Soyuz 19 will enter the co-zone of coverage of Eupatoria tracking station. After completing their dinner, the cosmonauts will have to sum up the results of the first half of their sixth work day. Then at the beginning of the 84th orbit they have to monitor the onboard spacecraft systems and get ready for the next comm session with Mission Control Center. After that, the crew will begin preparations for th - returning to Earth. This is Moscow Mission Control Center.)

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KIO (This is the Soviet Mission Control Center. In Moscow it is 18 hours. The 83rd orbit of the spacecraft Soyuz 19 is being completed. At the present time, the spacecraft is crossing the equator over South America. According to the flight program, the cosmonauts must - are about to finish their dinner and now begin to monitor there onboard systems of the spacecraft. At the end of monitoring the spacecraft systems, they will prepare for the next comm session with Mos - with the Moscow Mission Control Center, which will begin when the spacecraft en - Soyuz 19 enters the zone of coverage of the Eupatoria ground tracking station in 20-1/2 minutes. This is Moscow Mission Control Center.)

KIO (This is Moscow Mission Control. In 1 minute the Soyuz 19 spacecraft will enter the zone of coverage of the Eupatoria ground tracking station.)

CC-M (Soyuz, this is Moscow.)
SFE (Moscow, this is Soyuz 2. I read you well.)
CC-M (Soyuz 2, I have one radiogram without form - without form.)
CC-M (Ready. Number 78. On the 85th orbit at 19:39 to 19:43, comm with Salyut. How did you read?)

SFE (Over what?)
CC-M (Through Molniya satellites.)
SFE (On VHF, right?)
CC-M (Right. 19:39 to 19:33, comm with Salyut over VHF. Right. Valeriy, we would like you to get into comm mode 19:39, exactly. At 19:39, I will call you, and I will transfer you comm with Salyut. It's a short comm session, so it's important not to miss it.)

SFE (Okay.)
SFE (Moscow, this is Soyuz. How do you read?)
CC-M (Excellent with Soyuz.)
SFE (We - in the orbital module and am finishing off the remnants of the film - of the remaining film.)

CC-M (Valeriy, we would like to receive from you form 03.)
SFE Okay.
CC-M (Alexey, have you used up all the - all the colors?)
SCDR (Just half. All of Europe is covered with clouds.)
CC-M (We're ready for 3. Ready to receive 3.)
SFE (183, time: 18:10. First, 10; second, 200; third, 4; fourth, 200; 5, 16; 6, 300; 7, 16; 8, 300; 9, 4; 10, 4; 11, 210; 12, 210; 13, 202; 14, 202; 15, 28; 16, 20; 17, 2; 18, 9; 19, 20; 21, 21; 20 - 20th, 21st; 7; 22 760; 23rd, 760/745; 24th, 920; 25th 320; 26th 370; 27, 170; 28, 220; and 29, 220. How did you read? Over.)

CC-M (Thank you very much. Received you well.)
CC-M (Getting all packed away, and everything fits?)
USSR (Yes, just beginning to pack away. So far we've just gathered everything together. We have turned off simplex FM because today we have no comm with Apollo.)

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CC-M (Roger.)
CC-M (Valeriy, you want to go h - to come home? You want to
come home?)
SFE (Moscow, this is Soyuz 2. We still have to do a globe
check. It's not running right.)
CC-M (Okay, Valeriy.)
SFE (Now I'll get ready for it.)
KIO (This is Soviet Mission Control. In several minutes,
according - in - The Moscow Press Center will have its next briefing including -
We are turning on and turning the comm over the Moscow Press Center.)
KIO (Attention, this is Afinsky in the Soviet Press Center.
Today this one is to speak in summary way of the events. Then we will do it
as follows. Today after breakfast, the cosmonauts, Leonov and Kubasov, moni-
tored the function of the onboard systems of the spacecraft. At 10 hours 15
minutes Moscow time, the spacecraft Soyuz 19 commander with ... in the manual
control mode ...)

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AFINSKY (Today, this one is to speak in a summary way of the events, then we'll do it as follows. Today, after breakfast, the cosmonauts Leonov and Kubasov monitored the function of the onboard systems of the spacecraft. At 10 hours 15 minutes Moscow time, the spacecraft Soyuz 19 commander with using the manual control mode did a orientation towards the Earth in order to provide the proper conditions for the experiment of photographing and observing the Earth's surface. At this time, the flight engineer was preparing the equipment for this experiment. The purpose of this experiment is observation and photographing of the Earth. Also the receiving - data on the various areas of the Earth's surface and specific atmospheric formations for applied research. At 10:55 Moscow time Alexey Leonov did a comm session with the Soviet Mission Control Center. In doing this, he reported on the status of onboard systems. Also, he reported on manual orientation of the Earth and photographing of the Earth. After completion of the comm session, the spacecraft commander was engaged in - worked on the experiment Growth of Micro-Organisms. And the board eng - the flight engineer was working with the Zone-Forming Fungi. In this - doing this, Alexey monitored the various areas of micro-organism growth and Kubasov worked on - on setting the Zone-Forming Fungi. Then the cosmonauts began maneuvering of the spacecraft for preparations for descent and deorbit by turning on the - preparing for turning on the braking engines. The commander of the spacecraft first did a manual orientation towards Earth and then switched on the automatic orientation and attitude systems, using attitude control engines. As a result of these manual orientations, there - the braking engines were switched on for short bursts. At 12:45 Moscow time, Alexey Leonov reported to the Soviet Mission Control Center that the onboard systems were functioning normally and the braking engine also functioned normally during the checkout. During this comm session, at 13 hours 15 minutes, the central television announcer did a short interview with Leonov, which you just saw on television. At 14:05 the spacecraft was manually orien - did a manual orientation for its solar panels to be aimed at the Sun. Also, it's performing an angular rate movement at 3 degrees per second. After lunch, the cosmonauts continued their scientific experiments. At 15 hours 30 minutes until 16 hours 17 minutes Moscow time, the experiment on photographing the sunrise was performed. The purpose of this experiment was to measure the optical properties of the atmosphere and the atmospheric absorption of sunlight. During the course of this experiment, photographing was done of the rising Sun. During the time of the exposure of each - the time of exposure of each frame was accurately remar - put down, so that it would be possible to study the effects of the atmospheric layers on the surface. Further on, the crew did the final portion of the biological experiments: embryo development, and growth of micro-organisms. According to telemetric data, and reports of the crew, all onboard spacecraft systems are functioning normally. The health and condition of the cosmonauts is good. Pressure

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in the spacecraft is maintained at 740 millimeters of mercury, 18 degrees centigrade temperature is being maintained also. Now I will ask the shift flight director Blagov, Victor Blagov to speak. And the - Boris Yefimovich Belitsky.)

BLAGOV (Hello, dear comrades. Ladies and gentlemen. Our shift today completed its work at the Control Center. It is now shift 2, the Kravets shift, and shift 3, the Tsibin shift, which will work on. We did our best to carry out all the operations of the flight program for today as thoroughly as possible. Our main job today consisted in checking all the Soyuz systems and their readiness for tomorrow's descent. In effect, today's checking out of systems amounted to a dress rehearsal of tomorrow's descent. We carried out all the operations that are to be carried out during the descent over the same geographical location as they will be carried out tomorrow. The only difference was in the retro-rocket burn. This gave the craft an impulse of only 1-1/2 meters a second instead of the 100 meters a second burnout that will be effected tomorrow. The engine firing off - went off very smoothly, despite the fact that our shift was under some strain today. This strain was due to the fact that, on the one hand, we were rehearsing all the operations for tomorrow's descent and, on the other hand, we were still under the impression of yesterday's events which included a slight hitch in the redocking process. Therefore today, when there occurred a slight change in the pressure inside the Soyuz compartment, this was a 30 millimeter drop in pressure which we later traced to a change in temperature, we nevertheless delayed handing over our shift until we checked all the calculations and confirmed that this was simply due to the operation of the laws of physics. As a result, our first shift worked an extra 2 hours today. When there was no longer a slightest doubt about the reason for the temperature change and the pressure change, only then did we hand over the shift. Mr. Kravets took over his shift today in slightly unusual conditions. This is due to the fact that during his work - during this shift, he will be 40 years old. And for this reason the main hall at Mission Control Center looked somewhat unusual today. There was a big bouquet of flowers in front of the chief on duty. And flight director Yeliseyer, who is a very strict man ordinarily, was quite unable to find any argument that would prevent us from placing those flowers there. And Alexikin, our chief ballistics expert who has contributed a great deal to ASTP, even wrote some verses to mark the occasion. Well, of course, it would take some time to translate that in Russian, so I will have to give you simply a literal translation, which says that - the - that our - our excitement is due not to the fact that the ASTP is nearly over, but to the fact that Mr. Kravets is celebrating this anniversary.)

KIO You have a better translation, yes? Pardon? Oh, yes, yes, yes. (Laughter) (English)

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BLAGOV Mr. Blagov has kindly consented to leave us a test of this which which we can cope with afterwards. This is a further tribute to Mr. Kravets mentioning his hair, which is just turning gray, and expressing the hope that he will remain in that good shape on and on despite the fact that the flight is nearly over. So in short, the main hall at Mission Control Center had a very unusual, festive air today; there was none of the strict discipline ordinarily observed there. And we received a greet - a message of greeting from Neil Hutchinson, the silver - silver shift chief at Houston, Texas. And this message of greetings had the form of a map of the world on which the entire shift had signed their names. And there was also a message of greetings from our consultative group, Oleg Babkov and his colleagues, also at Houston. I delayed my departure from Mission Control Center in the hopes that Mr. Kravets, moved as he was by the occasion, might li - might like to let me work on, but this didn't happen. He went about his work as if he was not 40 today, but 20. At 6:35 work began on packing all the recoverable equipment; this includes the various test tubes, samples, other materials of the scientific work accomplished; all this was stored away in special containers for the descent. We attach great significance to this packing operation because the descent capsule, the descent vehicle, experiences great deceleration forces during the descent, and all the equipment must therefore be fastened carefully so that it would not cause any unpleasant surprises during the descent stage of the flight. Four hours have been allotted for this packing operation and that means that at this moment it is still underway. The operation will be completed at about 9:10 p.m. this evening, after which the crew of Soyuz will have a communication session with the Salyut crew. At 10 minutes to midnight the crew will go to bed until tomorrow morning. Tomorrow work begins at very early, at 7:45 a.m. Moscow time. After breakfast the cosmonauts will begin donning their pressure suits. This will be done in the orbital compartment; and at 10 mi - and at 9:40 A.M., Hatch number 5 - that's the hatch between the orbital compartment and the descent vehicle - will be sealed. And this will then be followed by the operations leading to the descent, operations which we rehearsed today. Tsibin will repeat all the operations we rehearsed today. The retrorocket will be fired at 10 minutes past 1 p.m. Moscow time, separation of the modules will occur 20 minutes later, and about 4 minutes later the descent vehicle and orbital compartment will reenter the atmosphere. The orbital compartment will burn up during the descent through the dense layers of the atmosphere, and the descent vehicle, on reaching an altitude of 10 kilometers, will pyrotechnically actuate the parachute system. Touchdown is to take place at 10 minutes to 2, Moscow time, not far from the town of Arkalyck, about 500 kilometers away from Baikonur, and the - and the search and rescue teams, news correspondents, and doctors, with helicopters, are already on hand there.)

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SPKR (Garble)

BLAGOV That will mark the end of the Soyuz flight and the joint flight, and Apollo will continue its solo flight for another 3 days. The descent of the Soyuz on parachutes, the parachute stage of the descent, and its landing will be shown live on color te - color TV. Questions please.)

BBC BBC. While we are talking about television, can you tell us if we will see pictures of the cosmonauts during descension inside the spacecraft, or do you still have a problem with the camera, black and white camera, which didn't produce those pictures on the takeoff? (English)

BLAGOV (You will not see the cosmonauts inside the descent vehicle. There was not enough time to repair the black and white TV camera.)

QUERY France Press.

KIO (The correspondent of the France Press Agency began by complementing Mr. Blagov on his account of today's proceedings at Mission Control. The correspondent said that Mr. Blagov's account would do credit to any journalist, he had done the work of the journalist for them actually, and he said that whereas Mr. Blagov could take over as a correspondent any day, many correspondents unfortunately could not take over the work at Mission Control. Going on to the specific question he said that General Berigovoy had once said in Paris that the preparations for the descent take 2 days, and did this in any way suggest that the descent might take place on Tuesday?)

BLAGOV (The work of bringing down Soyuz 18 has not yet begun. We know this definitely and that is a fact. And Tuesday is therefore out.)

QUERY Los Angeles Times. Have you any better idea now what caused the hard docking than you did this morning? (English)

BLAGOV (No, Vladimir Seromyatnikov gave full details, we feel, about the difficulties that arose during the redocking. I can only add that a full analysis of the causes of the hard docking has not yet been completed. There has been a conversation between Glynn Lunney and Konstantin Bushuyev on the subject, and it is not for me to speak about this before I have learned the full details of the analysis. And soon as that analysis is completed, full information will be placed before the public.)

LOS ANGELES TIMES Just a quick follow-up. Was the Soyuz crew at all apprehensive during this period? Did they say anything that would indicate they were under strain and fearful? (English)

BLAGOV (As you heard this morning, the initial approach was carried out very smoothly, and there was no problem at all until the moment of initial contact. No complaints were made by our crew. The subsequent operations took place very swiftly, and any reaction would have been possible only after the operations were over. The Soyuz and Apollo crew have discussed the - what occurred in full detail and have reported about it to Mission Controls.)

French Press Humanité, Paris. (A question from the Le Mon ... Humanité, in France, whether there were any joint research experiments today or whether today the scientific work was only under the separate programs?)

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BLAGOV (The joint experiments ended at 103 hours ground elapsed time and that was all. That was the Ultra-Violet Absorption experiment.)

CBS CBS news. I have about four questions, very short ones. The first one is, can you give me the length of time and the time tha the radio blackout will occur during reentry? (English)

KIO Just a moment. I'll translate them one by one. (English)

BLAGOV (From altitudes 80 kilometers to 30 kilometers there will be a radio blackout. During this period, the descent vehicle will be surrounded by plasma which effectively prevents the passage of radio waves, and there will therefore be no radio communication with it. After that radio communication will be reestablished and we will continue to receive their run - the crew's running commentary on the descent.)

CBS Is it normal - is it usual that the orbital module is not separated from the descent vehicle, but that it is allowed to burn up in the atmosphere? I was under the impression that it was pyrotechnically separated prior to reentry. (English)

BLAGOV (Separation will take place at 13:30 Moscow time, and reentry only 4 minutes later.)

CBS But you originally described the orbital module as not separating, but as burning up in the atmosphere. Is there an actual separation? In other words, does the descent module come in alone, or is it coming in with the orbital module? (English)

BLAGOV (Reentry takes place separately. The descent module is already separated from the orbital.)

CBS Does it - Does the descent mod - does the orbital module separate at the same time that the instrument assembly module separates? Is it before or after or ... ? (English)

BLAGOV (Yes, the orbital module separates together with the instruments and assembly module. The idea is to separate the descent vehicle from everything else so that it ...)

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BLAGOV (Yes. The orbital module separates together with the instrument and assembly module. The idea is to separate the descent vehicle from everything else so that it can ret - reenter the atmosphere alone.)

CBS What - what extent - how much g forces do you anticipate that the cosmonauts experience during reentry, and is there anything in the mode, in the manner in which reentry is carried out, to relieve the g forces? And that's my final question. (English)

BLAGOV (Not more than 4 g. I draw the conclusion that this correspondent hopes to become a cosmonaut. Becoming a cosmonaut requires a great deal of training, as you probably know, and it specifically requires training in reentry. Yes, the Soyuz descent has an aerodynamic lift, a small aerodynamic lift, and the descent is therefore not elliptic.)

KIO (The correspondent of the Hungarian newspaper, Nibs-abod-shag asks a question about the dress rehearsal for the descent. Was it a routine dress rehearsal or did it have any specific elements due to the trouble that occurred during redocking?)

BLAGOV (The dress rehearsal did not differ in any way from the descent routine tomorrow, and the only thing we did include in it extra was a very strict pressure integrity check to make sure that there was no disturbance as far as pressurization is concerned, resulting from yesterday's trouble. The pressure integrity check proved completely successful and this means we can go ahead with the descent without any apprehension.)

KIO (The - I was extremely interested, the correspondent said, in your mention of the 3 degrees per second rotation since this coincided - coincides exactly, according to some experts, with the rotation required to establish artificial gravity onboard a spacecraft. And is there any connection here?)

BLAGOV (Actually, some artificial gravity arises whatever the rotation, no matter how small it is. And the whole point is whether the cosmonaut, whether his organism, can appreciate so small a gravitational effect. You no doubt watched the TV programs from the Soyuz craft. You probably noticed that at some periods of time when the Soyuz craft was in rotation, as, following the undocking, some of the objects that were within the field of vision of the cameras began moving from one side of the craft to the other. And this was a consequence of the artificial gravity established aboard the spacecraft as a result of this rotation.)

CBS CBS news. I've got a couple of short questions, too. You mentioned that during the rehearsal today, the retrorocket was fired briefly. Can you tell us if this is your standard routine? Can you tell us at what altitude the - the retrorocket is fired in the descent module just before landing, and how that is done. Is it done manually or through some automatic system? (English)

KIO The first question was about the retrorocket, yes?
(English)

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BLAGOV (Yes, this is routine for the Soyuz craft. Before such a crucial operation as descent, it is customary to check all the main systems involved in the operation, including the retrorocket. The retrorocket will be fired tomorrow at 13:10, Moscow time. The retrorocket will be fired automatically, and it will be cut off automatically, too, after an automatic device has checked the necessary deceleration.)

CBS I was referring, though, to the braking rockets fired when the descent module is just 10 or 20 feet above the ground. (English)

BLAGOV (These retrorockets are also fired automatically at an altitude of 1 or 2 meters above ground. And they reduce the speed practically to normal, that is, to 0.1 - 0.2 meters a second. That is what we term a Soyuz soft landing.)

BLAGOV (We have time for two more questions.)

CBS I'm with CBS also. And I have a few questions also. Can you give us the time of the blackout, Mr. Blagov. You told us at what altitude it occurs but can you tell us when it occurs? (English)

BLAGOV (I'm sorry. I don't have the times with me. Mr. Kravets will bring the times tomorrow morning. I will give him the times.)

CBS And you do not have the times, I assume, for when the parachute is deployed. Is that correct? (English)

BLAGOV (No, you are wrong, I do have that time.)

QUERY Ah ... (Laughter) (English)

KIO Just a moment.

BLAGOV (1:35 p.m., Moscow time, of course. Altitude, 10 kilometers.)

CBS Is that preceded by a braking parachute? (English)

BLAGOV (No. That's the time when the parachute container is opened and the parachute system is actuated. First, the braking parachute is actuated and then the main parachute.)

CBS And my final - my final question is ... (English)

CBS My final question is, the Apollo spacecraft can adjust where it lands. Once it begins its reentry into the atmosphere, it can fly several hundred miles either way. Can the Soyuz do that? (English)

BLAGOV (Yes, the aerodynamic lift of the Soyuz does enable it to choose a landing site.)

CBS Can he be more specific? (English)

KIO I am afraid that all the rest will not be able to ask their last questions. Please, your question.

KIO (Soviet television wishes to know what Mr. Blagov will be doing now that his job at Mission Control is over, and will he appear here again?)

BLAGOV (I would like to hope that I will have at least a short rest from ASTP and from the press, but, unfortunately, I will continue to be both at Mission Control and here. Well, our time is up. 10:00 tomorrow morning.)

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KIO (This is the Soviet Mission Control Center. We have relayed the press briefing from the Moscow Press Center. We're continuing our commentary on the flight of the spacecraft Soyuz 19. The spacecraft is now completing its 84th orbit and is now located over the Pacific Ocean. During the last comm session with Mission Control Center, the crew of the spacecraft received a radiogram to the effect that, on the 85th orbit, the crew of Soyuz 19 will perform a ...)

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KIO (This is the Soviet Mission Control Center. We have relayed the press briefing from the Moscow Press Center. We're continuing our commentary on the flight of the spacecraft Soyuz 19. The spacecraft is now completing it's 84th orbit and is now located over the Pacific Ocean. During the last comm session with Mission Control Center the crew of the spacecraft received a radiogram to the effect that, on the 85th orbit, the crew of the Soyuz 19 will perform a conversation with the Salyut orbiting scientific station - space station. These - this conversation is - will take place. According to telemetry data received during the last comm session, all the systems are in order, normal, and the health of the cosmonauts is also in - normal. The air pressure in the descent vehicle of Soyuz 19 is, 734.7 millimeters of Mercury; in the orbital module, 737 millimeters; temperature of the air in the descent vehicle is 18.48 degrees Centigrade; orbital module temperature, 20.1 degrees Centigrade. According to the flight program, at the present time the cosmonauts engaged in preparations for return to Earth. They are tacking [sic] away the returnable and unreturnable equipment. The returnable equipment includes the symbolic - symbolically exchanged gifts between the astronauts and cosmonauts. Various samples and - scientific experiment devices are also included. All returnable items and non-returnable equipment is being packed in special containers. The returnable equipment will be installed in the descent vehicle and the non-returnable will remain in - in the orbital module. At - On the next orbit, at the end of the comm session, the crew of the Soyuz spacecraft will continue to pack away the returnable and non-returnable equipment. The next regularly scheduled comm session between the spacecraft and the Moscow Mission Control Center will be in 8 minutes. This is Moscow Mission Control Center.)

KIO This is the Soviet Mission Control Center. (The spacecraft has just passed over the tracking ship Academic Serge: Korolev.)

SALYUT (After all I was born in Sverdlovskaya Ablast the city of metallurgists and steel workers, and miners. Congratulations - would you pass on our congratulations to the steel workers.)

CC-M How about on television?

SALYUT (All right.)

KIO Soviet television. We are glad to greet you. Pyotz Illyich and Vitaliy Ivanovich. We know, that precious in any space program is time. Approximately in 1.5-2 minutes you will be able to speak to your friends Alexey Archipovich Leonov and Valeriy Nikolayevich Kubasov. At this transmission is a part of the program "Time" we ask you to tell our audience, in brief, the last news onboard your station. We are listening to you with the greatest attention.

ASTP (USSR) MISSION SR152/2
Time: 11:18 CDT, 123:58 GET
7/20/75

SALYUT What can I say? We, Vitaly and I, watched the program today, each minute of it, before the communication session. We have been in flight 59 working days and 58 usual, calendar days. We feel well. We fulfill the program completely, what was planned. Not very much remains, and we are very glad that we were present at the moment when the historical event was taking place - the docking of two ships Soyuz and Apollo. We had the opportunity to talk to the Soyuz 19 crew, to Alexey Leonov and Valeriy Kubasov, once. We are, of course, very happy and cheerful and very excited.

CC-M Excellent. Vitaliy Ivanovich, you are a Soviet television special correspondent onboard your station, and that is why (... we also wanted to hear a few words from you.)

SALYUT (This last event, one orbit ago, we finished the 900th orbit of this flight; 900 orbits is a great deal. This is very difficult - this was a great amount of work, and we indeed were - are excited - and have been watching with excitement about this international meeting in orbit. The Soyuz Apollo. Since the docked portion was completed successfully, the spacecraft are flying separately now, and we will be happy to meet with our colleagues Leonov and Kubasov. But we still have some work to do - we still have some, and then we will be returning to Earth soon. We're awaiting with - anxiously and joyously. I hear now that Sweden is - your friend Sweden, the Capcomm is trying to reach - get into communication with Soyuz 19 crew.)

CC-M (Soyuz, this is Moscow. Now we will give you the opportunity, my dear friends, to talk with Leonov and Kubasov.)

SALYUT (Thank you.)

CC-M (Soyuz, this is Moscow. The TV viewers will be listening to this (garble).)

USSR (Com Cos, this is Soyuz. How do you read?)

SALYUT (We read you.)

USSR (Moscow, this is Soyuz. How do you read?)

CC-M (Soyuz, this is Moscow. I read you well. I'm transferring you over for communication with Comm Cos. Ready for comm.)

SCDR (Comm Cos crew. Leonov calling, Soyuz calling. Comm Cos, both of you, how do you read Soyuz?)

SALYUT (Soyuz, this is Comm Cos. Ready for comm.)

SCDR (Comm Cos, this is Soyuz. How do you read?)

SFE (Comm Cos, this is Soyuz 2. How do you read? Over.)

SALYUT (Soyuz, this is Comm Cos. How do you read?)

SPEAKER (Soyuz - -)

USSR (Comm Cos, this is Soyuz. How do you read? How do you read me?)

SALYUT (This is Comm Cos 2.)

SALYUT (Soyuz, how do you read us? This is Comm Cos 2.)

SCDR (You must be tired. You've done a lot of work already and your work is also about to come to an end. And - and we are very happy that you have accomplished a great deal. We wish you a successful completion of your program of work. You are working excellently, we know about it and we were listening to you constantly. We've just

ASTP (USSR) MISSION SR152/3
Time: 11:18 CDT, 123:58 GET
7/20/75

finished our program, our packing all our equipment away. There is a great deal of equipment. And, tomorrow we will be turning on - switching on our home - homeward bound engine. Valeriy wants to say something.)

SFE (Comm Cos, - both of you. This is Soyuz.)

SALYUT (We hear you excellently, Valeriy. I'm happy to hear you.)

SFE (Well, tomorrow we are planning to return to Earth. We'd like to wish you successful work, since you'll still be continuing your flight. And, have a soft landing to you after you complete all your work. And - and then until we meet back on our Earth.)

USSR (Comm Coses, how do you read?)

CC-M (They've alr - Soyuz, this is Moscow. They've already had LOS. We have one minute left.)

USSR (Okay. One container is completely packed and everything absolutely has been prepared to pack the other two containers.)

CC-M (Alexey, we are awaiting a more detailed - Over Moscow, at 19:53, a more detailed report. Both of you should plug in by the beginning of the next comm session. We'll be taping you.)

USSR (Roger. Soyuz 19.)

CC-M (We'll await a more complete report about all your packing operations.)

END OF TAPE

ASTP (USSR) MISSION SR153/1
Time: 11:52 CDT, 124:32 GET
7/20/75

KIO (This is Soviet Mission Control Center speaking. In 1 minute, the Soyuz 19 spacecraft will enter the radio comm area of Eupatoria ground tracking station.)

CC-M (Soyuz, this is Moscow.)
CC-M (Soyuz, this is Moscow.)
CC-M (Soyuz, this is Moscow.)
CC-M Soyuz, this is Moscow.
USSR (Standing by. I read you well.)
CC-M (How about the globe correction report?)
USSR (We corrected the globe at the scheduled time - a radiogram without form.)
USSR (79. At 19:57:10, the delta-V 057.6 on the (garble). How did you read?)
CC-M (At 19:57:10, we will give you a delta-V 057.6.)
USSR (19:57:10, setting 057.6.)
CC-M (Roger. Continue monitoring. Have you plugged yourself in?)
USSR (Yes.)
CC-M (Roger.)
CC-M (Nominal setting?)
USSR (Of course.)
CC-M (Roger.)
USSR (Georgy, are you planning to transmit to us the number of onboard documentation page numbers?)
CC-M (Definitely, at the next comm session. Valeriy, I want you to report to us more de - in greater detail - how you are packing away is proceeding.)
USSR (Roger. I'll tell you. Everything here is already concentrated in two bags. One container has been packed and zippered up, we are all done with it. Two containers remain, and we still have to put on our pressure garment assemblies.)
CC-M (So, Roger. If I understand you correctly, you have no problems with packing, right?)
USSR (So far, no problems.)
CC-M (Thank you.)
USSR (Roger.)
USSR (The third is the most complicated, but both of us together, we hope, can manage to pack it all away.)
USSR (57.6 delta-V on the command and signal radio line. We've put in the setting.)
SFE 195 seconds.
CC-M (Alex - Alexey, I will dictate to you what you have to put into the documentation from the plan of joint activities.)
USSR ... (Garble) number 2. 15th, 19th, 23rd, 37th, 41st. Stop. This is 4031.)
USSR (Roger. Read back.)

ASTP (USSR) MISSION SRL53/2
Time: 11:52 CDT, 124:32 GET
7/20/75

CC-M (Affirmative.)
SFE (We have two copies of this 4301.)
CC-M (Valeriy, where - there where - the one that's written in.
You have - if you have it in two copies, then in two.)
SFE (And if it is not anywhere, we don't have to do it, correct?)
CC-M (They tell me here that it should be in there.)
SFE (4600.)
CC-M (1-3, 6-1, and 2-17. This is from book 1. Book 2: 6-3,
6.3, 7th, 9th, 13th, 15th, 47th, 63rd, 65th, 71st, 77th, 83rd, 87th, 93rd.
Give me a readback quick.)
SFE (A readback.)
CC-M (Book 3. 6.5, 5th and 7th. Book 3. 05, 6.3. That's all
that they wanted you to take back from all these books. The rest, according
to your own judgment. Maybe you've made some entries in other places.)
SFE (Well, a lot of it was carried over already. It was trans-
ferred to the log.)
CC-M (I have 20 seconds. Have a happy flight. We'll meet at
21:01 through Academician Korlev che - tracking ship.)

END OF TAPE

ASTP (USSR) MISSION SR154/1
Time: 12:31 CDT, 125:11 GET
7/20/75

KIO (This is the Soviet Mission Control Center. Moscow time is 20 hours 31 minutes. The 85th orbit of the spacecraft Soyuz 19 is continuing around the Earth. At the present time Soyuz 19 spacecraft is in the Southern Hemisphere in range of the Orroal, Australia, zone of coverage, in the Earth's shadow. During the last comm with Mission Control Center and the spacecraft, the crew reported on its activities during this orbit. The cosmonauts reported that they are engaged in the packing away of returnable and nonreturnable equipment. One bag with equipment was already packed, and it has been placed in one of the containers. The operations on stowage of equipment is being - are being continued in this orbit also, until the end of this orbit. According to telemetry data the conditions of the onboard systems of the spacecraft is normal. No comments or remarks to be made on the health and - of the spacecraft. Air pressure, 737 millimeters in the descent vehicle and in the orbital module, 739 millimeters of Mercury. Air temperature in the descent vehicle is 18 degrees Centigrade; in the orbital module, 20 degrees Centigrade. And thus is the 85th orbit of life of Soyuz 19th spacecraft. Soyuz has been in orbit for 125 hours and 13 minutes. Parameters of the orbit on the 85th orbit: maximum altitude, 218.53 kilometers; minimum altitude, 211.41 kilometers; orbital period of the spacecraft, 88.73 minutes; orbital inclination to the equator, 51.78 degrees. The 6th working day for the crew of Soyuz 18 [sic] is approaching its end. By the end of this working day, the crew will continue preparations for deorbit and will be engaged in packing away the equipment. The next comm session with the spacecraft crew with Mission Control Center will be when Soyuz 19 enters the field of coverage of the tracking ship - 21 hours 1 minute Moscow time, entering the zone of coverage of the Academician Korolev tracking ship. This is Moscow Mission Control Center.)

KIO (This is the Soviet Mission Control Center. Moscow time is 20 hours 56 minutes. The 85th orbit of the spacecraft Soyuz 19 around the Earth is being completed. Until the next comm session of the crew with Mission Control Center, 4-1/2 minutes. Now the comm session will be over the Academician Sergei Koro - Korolev tracking ship. It will last 6-1/2 minutes. Then, at 10 hours 21 minutes, the spacecraft will enter the zone of coverage of the Gagarin tracking ship, and at that orbit communications will be continued. 21:26 minutes, Soyuz 19 will enter the Eupatoria ground station comm range. At 21 hours 33 minutes when Soyuz 19 leaves the radio zone of coverage of Tbilisi ground station. The - the predicted orbit for the upcoming 86th orbit: maximum altitude, 218.37 kilometers; minimum altitude, 211.26 kilometers; period of rotation, 88.73 minutes; orbital inclination to the or - equatorial plane, 51.78 degrees. At the present time, Soyuz 19 is crossing the equator and will soon begin its 86th orbit. The spacecraft is over the Pacific Ocean and is approaching the zone of coverage of Academic Korolev space tracks - space - tracking ship. The cosmonauts are getting prepared for in - are engaged in stowing the returnable and nonreturnable equipment into their bags. This is Moscow Mission Control Center.)

ASTP (USSR) MISSION SR154/2
Time: 12:31 CDT, 125:11 GET
7/20/75

KIO (This is Soviet Mission Control Center. I on half minute the spacecraft Soyuz 19 will enter the zone of coverage of the tracking ship, Cosmonau - sorry about that (Academician Sergei Korolev tracking ship.)

CC-M (Soyuz, this is Moscow.)

CC-M (Soyuz, Soyuz, this is Moscow. How do you read me?)

CC-M (Soyuz, this is Moscow.)

CC-M (Soyuz, this is Moscow. How do you read me?)

SCDR (Moscow, this is Soyuz. How do you read?)

CC-M (Excellent. How - how me?)

SCDR (Excellent.)

CC-M (Alexey, I wanted to know how your things are going with the packing of the returnable equipment and also the equipment that is staying, without being returned.)

USSR (The situation is as follows. The returnable equipment is completely packed, all three sets. That's all three containers are closed and sealed. We haven't put the documentation away. It all - What remains is to look at the document, to pull out the pages that we need, and with that we will have finished with the returnable equipment. But we've been putting things away gradually since the very first day, so partially everything is all put away and there is hardly anything left to do.)

- - -

--- Roger.

USSR (No questions about the packing away, right?)

SCDR (No questions.)

CC-M (All right, Roger.)

SCDR (How's the weather in Moscow?)

CC-M (Today is a nice day, Alexey. Excellent day.)

SCDR (Today is Sunday?)

CC-M (Would you believe. (Laughter))

SCDR (Have you - have the doctors analyzed our condition?)

CC-M (Yes. Incidentally, have you finished - have you carried out the recommendation?)

SCDR (No, not yet. You mean so that we would sleep more soundly, yes?)

CC-M (Yes, that too. But they do recommend that you take those pills.)

CC-M (How did you read?)

SCDR (I understand. On the ground I have occasionally a 44 pulse, now it's 38. So - (garble))

CC-M (You have comm with the Apollo?)

CC-M (No, we have lost it. They don't hear us anymore.)

CC-M (Also, we have not heard them during the last two orbits.)

CC-M (Valeriy, are you ready for form 020 in the next zone of coverage? You should transmit it to us.)

ASTP (USSR) MISSION SR154/3
Time: 12:31 CDT, 125:11 GET
7/20/75

SFE (What form?)
CC-M (020.)
SFE (020? No, we were not ready with it.)
SFE (Do you need it?)
CC-M (Of course we do, of course.)
SFE (Okay, we'll transmit it.)
CC-M (Not in this zone of coverage, the next zone.)
CC-M (If you can't do it over the Gagarin, you can do it in
Moscow.)
SFE (You mean everything that we gave you the last time? If
you take this one, then you will have a 1 to 1. Okay, if the doctor is
talking.)
CC-M (No. Boris is here all day today.)
CC-M (I have 30 seconds. And In two minutes you will meet
over the Yuri Gagarin ship.)
SFE (Roger.)

END OF TAPE

ASTP (USSR) MISSION SR155/1
Time: 13:09 CDT, 125:49 GET
7/20/75

KIO (This is Soviet Mission Control Center. In one minute the Soyuz 19 spacecraft will enter the zone of coverage of the Yuri Gagarin tracking ship. We would like to remind you that at the current, 86th, orbit, in order to - the Eupatoria and Tbilisi will also - tracking stations will also participate in setting up comm with the spacecraft.)

CC-M (Soyuz, this is Moscow.)
CC-M (Soyuz, this is Moscow.)
CC-M (Soyuz, this is Moscow.)
CC-M (Soyuz, this is Moscow.)
USSR (Okay, comm, I hear you well.)
CC-M (I wanted to give you form 3.)
USSR (Form 3?)
CC-M (Yes.)
USSR (Wait a minute.)
CC-M (Okay, give number 80.)

Orbit, 85; the buffer batteries, 125; the main system - control system fuel, 80; backup, 20. How did you copy?)

USSR (Fuel, 80; backup, 20; and battery capacity, 125 ampere hours.)

CC-M (Affirmative. Roger.)
CC-M (In 10 minutes you will have comm.)
USSR (Thank you.)

KIO (This is the Soviet Mission Control Center. Moscow time is 21 hours. The - the comm session has been completed over the Korolev and Gagarin tracking ships. Next comm session will be in 6 minutes, when the spacecraft Soyuz 19 enters the radio coverage area of the Eupatoria tracking station. So far the cosmonauts are packing away the returnable and the non-returnable equipment. After the comm session over Eupatoria ground tracking station and Tbilisi, the cosmonauts, according to their flight program, will have supper. And then, until - until the 88th orbit, somewhere around the middle of the 70 - 87th, they will complete stowing away the returnable and non-returnable equipment. During the last comm session the crew reported that all 3 bags with equipment have been packed and placed in the container. Upon completion of the stowage - stowing operations of the equipment, the spacecraft crew will monitor the oper - the functioning of the onboard systems. Will do their evening - ablutions and go to sleep. And then in three minutes, next comm session will be over Eupatoria. This is Moscow Mission Control Center.)

END OF TAPE

ASTP (USSR) MISSION SR156/1
Time; 13:36 CDT, 125:06 GET
7/20/75

KIO (This is Moscow MCC. In one minute the Soyuz spacecraft 19 will enter the AOS of the Eupatoria ground tracking station.)

CC-M (Soyuz, this is Moscow.)

CC-M (Soyuz, this is Moscow.)

SCDR (Go ahead, Moscow.)

CC-M (How are things?)

SCDR (Everything's okay.)

CC-M (Alexey, Boris really, really seriously recommends before you go to sleep, you take Phenobut. Yes. Right before you go to sleep. And, take a couple of tablets of Pamangin)

SCDR (Two or one?)

CC-M (No. He says go ahead, take one. One at a time.

Alexey, I think you should really follow that recommendation.)

SCDR (Yes. Sure. Of course. We'll do that. I'll remember.)

CC-M (Okay. That's good.)

CC-M (Alexey, if you finish everything then you can go ahead and go to sleep. We're not going to bother you anymore. This is our latest - my last communication session with you. Tomorrow you've got a tough day. You're going to have to really get a good night's sleep.)

SCDR (We're going to monitor a few things over the surface of the Earth for a while. We have to get our documents together, and our work is basically all finished.)

CC-M (Okay. In other words, what we're saying to you, Alexey, is go ahead and get some sleep. Valeriy here, who is my shift man here, wishes you the best. We're going to wae - wait for you when you get back to Earth. We've - We really missed you)

SCDR (So - one - somebody said - Some wise man said about 200 years ago that when you travel, you travel around the Earth and travel and you finally come home, you finally really realize how good it is.)

CC-M (Good-by until tomorrow, Alexey.)

KIO (This is Moscow MCC. Moscow time is 21:37. We're now through our 86th orbit. A couple of minutes ago the regular communication with the - between Moscow MCC and the spacecraft was finished. Based upon the telemetric data given, the systems of the spacecraft are as follows: The pressure in the descent vehicle is 745 millimeters; in the orbital module, 737 millimeters. The temperature of the air in the descent vehicle is 18.4 degrees Celsius; in the orbital module, 19.4 degrees. The regular working day of the crew has come to an end. In the last communication the Moscow MCC allowed the cosmonauts to go ahead and go to sleep. The cosmonauts have fully completed the program of today's schedule, and in this manner they will have their supper and go to bed. This is Moscow MCC. Out.)

KIO (This is Moscow. Moscow time is 22 hours 21 minutes. The 84th orbit of the Soyuz 19 is coming to a close. The spacecraft is now above the Pacific Ocean and is coming - is nearing the equator. The 6th regular working day of the crew is coming to an end. Let's summarize in a few words what has taken place in this last working day. In accordance with the flight plan, Alexey Leonov and Valeriy Kubasov woke up

ASTP (USSR) MISSION SR156/2
Time: 13:36 CDT, 125:06 GET
7/20/75

approximately at 9 o'clock in the morning. After waking, they checked the operation and functions of the onboard systems, had their breakfast. At the end of the 78th orbit the crew, Alexey Leonov, the commander, carried out an Earth orientation; the flight engineer, Valeriy Kubasov, kept doing some of the ongoing experiments. In the 79th orbit, Alexey Leonov and Valeriy Kubasov carried out the regular operations in - tied in to the pelagic studies which they had to be carrying out. The growth of micro-organisms was monitored and Valeriy Kubasov also took some shots in the Zone-Forming Fungi experiment. And then they also prepared for the landing which will take place. The program was terminated with their - their operations at 12 hours 30 minutes. After finishing the pro - the test of the - testing the systems for the landing the Soyuz 19 did a solar spin orientation maneuver, and the spin was done in - with a speed - with an angular speed of 3 degrees. This was all done in the 78th orbit. Then again the cosmonauts had lunch and began preparing for the experiment of photographing the Sun's rise, which they did in the 82nd and 83rd orbits. At the end of the 82nd orbit, they also performed the experiment of the - silverfish experiment. After doing the scientific experiments the cosmonauts had their dinner, they checked the onboard systems again and began preparing for their final descent to Earth; checked the returnable and nonreturnable equipment. This was all done in the subsequent three orbits of their flight. In the 86th orbit, having done the whole program planned for that day, the crew received permission from the Moscow MCC to have their final supper and to go to bed for rest. The communications session, which should take place in 18 minutes through the Gagarin tracking ship ... The systems will all be in their normal operational mode. In this way, the last day of the crew of the Soyuz 19, has taken place. Tomorrow the crew will be returning to Earth. The program will be discussed for you in our subsequent commentaries. Now, in about 15 minutes, they will be nearing the equator and in a few minutes they will begin their 88th orbit around the Earth, the orbit of the Soyuz 19 spacecraft. In this 88th orbit - in this 87th orbit the tracking stations involved will be the Cosmonaut Yuri Gargarin tracking ship and others. This is Moscow MCC. Out.)

END OF TAPE