



Targeting the Language Proficiency Needs of Aerospace Professionals: Teaching ISS RS Acronyms to Flight Controllers at NASA

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The JLEC and Its Mission: Foreign Language Study at JSC

- The primary mission of the Johnson Space Center Language Education Center (JLEC) is to fulfill the Russian-language proficiency needs of the NASA Astronaut Corps, IP astronauts, and non-astronauts involved in the operation of the International Space Station
- Other languages we currently teach or have taught in the past:
 - ESL for cosmonauts and other IP astronauts
 - French, Japanese, German, Italian

Overview

- This talk will focus on a course which is:
 - A group class (vs. astronaut tutorials)
 - Composed of non-astronaut flight controllers*
 - * Flight Controllers monitor real-time telemetry (data) and execute procedures to ensure crew safety, vehicle safety, and mission success
 - The course I'll be speaking about today is the ISS RS Acronyms is just one of a series of classes for "Boot Camp"
 - Boot Camp is a 3 month set of introductory courses which prepares students for the technical and operational competencies they will need as flight controllers
 - Most other Boot Camp courses are highly technical and delivered in lecture form
 - The Russian ISS Acronyms Course, by contrast, is highly interactive, something students seem to appreciate

Acronyms Classes Offered at JSC, Past and Present

- The need for acronyms classes is not limited to one group
- Over the years, instruction in ISS RS acronyms has been provided for:
 - Medical Operations—2001-2003
 - RST (Russian Segment Training) Operators—2003
 - ASCANs (Astronaut Candidates)—2021, 2023
 - Flight Directors—2022
 - Boot Camp—2004-present; taught 2-4 times yearly, depending on need
 - March of 2023 was the 37th iteration of Boot Camp; #38 is currently being taught
- Since the Boot Camp version of this class is taught most frequently, my remarks are based on this course

Why is Learning ISS RS Acronyms Important?

- NASA managers recognize the need to train incoming flight controllers to be able to identify and use ISS Russian Segment acronyms in their work
 - ISS Flight controllers regularly work with documents that contain Russian acronyms
 - In English-language documents, Russian acronyms are rendered in Cyrillic and in brackets to avoid potential confusion with English acronyms, e.g., [CBO]
 - This procedure is also used in Russian-language documents for English acronyms: [PMA-1]
 - They will also hear these acronyms in space-ground communications while carrying out their duties
 - The ability to readily identify and comprehend these acronyms is essential for students to function as efficiently and accurately as possible in their jobs

Acronyms are indeed pervasive in the aerospace industry!

Boot Camp participants come from various disciplines, each of which has its own set of relevant acronyms

- **CRONUS** = *Communications RF [Radio Frequency] Onboard Networks Utilization Specialist*
 - Equivalent CST-100 [Crew Space Transportation] and Orion positions:
 - Command and Data Handling (CDH)
 - Instrumentation and Communication (INCO)
- **SPARTAN** = *Station Power, Articulation, Thermal, and Analysis*
 - Equivalent CST-100 and Orion position:
 - Mechanical and Power Officer (MPO)
- **ETHOS** = *Environmental and Thermal Operating Systems*
 - Equivalent CST-100 and Orion position:
 - Emergency, Environmental, and Consumables Manager (EECOM)
- **ADCO** = *Attitude Determination and Control Officer*
 - Equivalent CST-100 and Orion position:
 - Guidance, Navigation, and Control Officer (GNC)

Acronyms Class Materials Available on the JLEC Website

ISS Russian-Segment Acronym Materials

General Materials

Materials for Specific Groups

■ [Reading Russian Segment ISS Acronyms \(General\)](#)

■ [Boot Camp Acronyms Class Materials and On-Line Exercises](#)

■ [The Russian Alphabet \(Audio File\)](#)

■ [Reading Russian Segment ISS Acronyms \(for RST Operators\)](#)

■ [Russian Alphabet Chart for Acronym Pronunciation](#)

■ [Reading Russian Segment ISS Acronyms \(for Med-Ops\)](#)

■ [Cardinal Numbers \(Audio File\)](#)

■ [Acronyms Exercises for Medical Operations--Self Quiz](#)

■ [MLM Acronyms](#)

■ [Acronyms Exercises for Medical Operations--Answer Key for Self Quiz](#)

■ [Med Ops Acronyms--On-Line Self Quizzes](#)

[Boot Camp Web Page with Exercises](#)

From Raw Materials to On-Line Exercises (Hatch Abbreviations on the ISS RS)

Sample of the raw materials used to create these exercises

Аббревиатуры люков в российском сегменте		
Модуль/Корабль	Аббревиатура	Название
СМ	ПрК-СУ	Переходная камера - стыковочный узел
	РО-ПрК	Рабочий отсек - переходная камера
	РО-ПхО	Рабочий отсек - переходной отсек
	ПхО-СУ (ФГБ)	Переходной отсек - стыковочный узел (Функциональный грузовой блок)
	ПхО-СУ (МИМ2)	Переходной отсек - стыковочный узел (Малый исследовательский модуль 2)
	ПхО-СУ (МЛМ)	Переходной отсек - стыковочный узел (Многоцелевой лабораторный модуль)
МИМ2	МИМ2-СУ	Малый исследовательский модуль 2 - стыковочный узел
	МИМ2-СУ (СМ)	Малый исследовательский модуль 2 - стыковочный узел (Служебный модуль)
МЛМ	МЛМ-СУ (СМ)	МЛМ - стыковочный узел (Служебный модуль)
	МЛМ ПГО-ГА	МЛМ приборно-грузовой отсек – герметичный адаптер
	МЛМ-СУ (УМ)	МЛМ - стыковочный узел (Узловой модуль)
	МЛМ-ШК	МЛМ – Шлюзовая камера
ФГБ	ПГО-СУ (СМ)	Приборно-грузовой отсек – стыковочный узел (Служебный модуль)
	ПГО-ГА	Приборно-грузовой отсек – герметичный адаптер
	ГА-СУ	Герметичный адаптер - стыковочный узел
	ГА-РМА1	Герметичный адаптер – Pressurized Mating Adapter 1

The resulting exercises:

1. [Quiz 1](#)
2. [Quiz 2](#)
3. [Quiz 3](#)

Course Content

- This is a course for students with *no previous Russian language experience*
 - Acronyms classes are not designed for acquiring general proficiency in Russian
 - Focus is on the specific acronyms that students will need for work
- This is an “on-demand” class, requested by the management of each group and its specific training needs
- The organization requesting the class is the sole provider of its technical content

Course Content

- The choice of other, non-technical content and the method of delivery are determined by the course designer
- Tools used in materials preparation:
 - [NASA Lexicon Glossary Search](#)
 - Consultations with astronauts, cosmonauts, and other area specialists
- While these materials are available in digital format online, students prefer working from the hardcopy, so they are more readily able to take notes (and play Bingo!)

Course Mechanics

- Course length: each group receives 2 sessions of 1.5 hours in duration, with a gap of at least a week between classes
 - This gap is designed to help students' retention of materials
- Class size
 - Optimal class size is 8, though we have accommodated larger classes when needed
 - Usually there are 3-4 groups in each class
 - Most recent group in March had 70+ students, divided into 10 groups
- No formal written tests are given at any point in class
 - Active student participation in class activities is the main focus
 - Students do, however, have the opportunity to test themselves on the course material via exercises on our website:
 - [CDH.Eng.to.Russ.Matching.htm](#) [CDH.Russ.to.Eng.Matching.htm](#)
- Early in the Pandemic, the BC Acronyms Course was taught remotely, adding new challenges

A Few Other Things

- Keeping the class as interactive and fun as possible has proven especially important
 - Students come from engineering backgrounds and often have little second-language learning under their belts
 - Having to cope with a new alphabet and sounds can be intimidating, and using humor has been very helpful in pulling students out of their fears
 - Example: Pronouncing Russian “o”
- Despite not having studied any Russian, students often have already encountered and picked up a few common ISS-related Russian acronyms and words in their work
- This can lead to ossified errors as students understandably repeat what they have heard others say. For example:
 - СУДН (Motion Control and Navigation System; Система управления движением и навигацией)
 - While the correct pronunciation is “Soo-deh-enn,” many have heard it as “Sooden”
 - Союз, the Russian spacecraft used to transport humans to the ISS
 - The correct pronunciation is “Sah-YOO-c,” but most all say “SOY-yoo-z”

The Course

**An Introduction to ISS Russian-Segment Acronyms:
Identification and Pronunciation**

for
BOOT CAMP



Dr. Anthony Vanchu, Instructor

Based on NASA ISS Documents and Acronym Materials

Revised March, 2022



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Course Objectives

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This course provides a brief introduction to and overview of the Russian alphabet and how it is used to identify and pronounce specific ISS RS acronyms. The course will offer familiarization with the...

- 1. Names of Russian letters used in pronouncing ISS RS acronyms**
- 2. Sounds made by Russian letters when pronounced in a word**
- 3. Russian cardinal numbers 0-10**
- 4. Identifying and speaking ISS RS acronyms relevant for Boot Camp participants**
- 5. Designations of ISS RS hatch acronyms**
- 6. And, time permitting... learn a few phrases of everyday Russian**

One Thing about Acronyms...

A particular acronym can be used so frequently that users are no longer cognizant (if they ever were?) of the words that generate it

An acronym that everyone who works at NASA knows: **SATERN**

But what does it stand for?

SATERN = The System for Administration, Training, and Educational Resources for NASA

An interesting example of how the underlying elements of an acronym are manipulated to generate an acronym that is easy to remember

Pronouncing Acronyms

Both English and Russian acronyms are spoken out in one of three ways:

1. By saying the name of the first letter of each constituent word
2. By saying the acronym as a word
3. By saying it as a combination of 1. and 2.

Can you name some examples of each type of acronym pronunciation in English?

1. CSA (Canadian Space Agency), EPA, IRS, IPA
2. NASA, ESA, JAXA
3. .jpeg, ECLSS, fPIP

Determining the Oral Rendition of an Acronym: Usage in Specialized Communities

- Knowing how to express an acronym can be a matter of being an “insider,” a member of the group uses the acronym
- For example:
 - How is it that most Americans know to pronounce the acronym NASA as a word and not “N-A-S-A”?

Any guesses as what percentage would have difficulty unpacking the acronym?

[Here's a random sampling...](#)

Acronym Usage in Specialized Communities

The Eternal Question...



or



???

Acronyms Can be Expressed Differently within the Same Professional Group

- Two subgroups within the NASA EVA group use different *verbal renderings* of the acronym for the Secondary Oxygen Package (SOP), which is part of the EMU “backpack.”
- Within the EVA group:
 - Engineering will say **SOP** as a *word*
 - Operations says **S.O.P** *where each letter is spoken individually*
 - **So while the written forms are identical for both groups, the actual pronunciation, in this case, differs.**

This Also Occurs in Russian

- The Soyuz acronym CA-BO, used to refer to the descent module (CA) and the orbital module (BO) while mated, is pronounced in one of two ways:
 - Letter by letter: **Ess-Ah-Bey-Oh**
 - As a word: **Sahboh**
- This difference can be heard on the loops and seems to be motivated mostly by personal choice

An Introduction to the Russian Alphabet

- The Russian alphabet consists of 33 characters
 - It is part of a family of alphabets known as “Cyrillic” alphabets
 - Its origins trace back to the 9th Century from an area currently part of modern-day Bulgaria
 - The contemporary Russian alphabet is the result of numerous modifications over the centuries; the modern-day version was codified ca. 1920
 - Several other Slavic (and even non-Slavic) languages use versions of this alphabet:
 - Ukrainian, Serbian, Bulgarian, Belarusian (Slavic); Mongolian, Uzbek, Tadjik (non-Slavic)
- In this course, we will first focus on the sound values for *the names of the letters* in the Russian alphabet

Knowing these letter names is crucial since approximately 90% of acronyms are pronounced by using letter names alone

Expressing Acronyms in Russian

- ▶ Most acronyms consist solely of upper-case letters
 - Lowercase letters will, however, be encountered
 - Fortunately, lowercase letters are readily recognized since all lower-case letters are simply smaller versions of their uppercase versions: **Г/г, Ж/ж, Я/я, etc.**
 - The one exception is **Б/б**
- ▶ Five letters on the following chart have been shaded out since they will not be utilized here:
 - These three letters *never* serve as the initial letter of *any* Russian word: **Ы, Ъ, Ь**
 - Two others do not appear in acronyms relevant to this course: **Ё, Ы**

The Russian Alphabet: Pronunciation by Letter Name

	Letter	Name			Letter	Name			Letter	Name
1.	А	[ah]		12.	К	[ka]		23.	Х	[hah]*
2.	Б	[beh]		13.	Л	[ell]		24.	Ц	[tseh]
3.	В	[veh]		14.	М	[emm]		25.	Ч	[cha]
4.	Г	[geh]		15.	Н	[enn]		26.	Ш	[sha]
5.	Д	[deh]		16.	О	[oh]		27.	Щ	[shsha]
6.	Е	[yeh]		17.	П	[peh]		28.	Ъ	[hard sign]
7.	Ё	[yoh]		18.	Р	[err]		29.	Ы	[ɨ]
8.	Ж	[zheh]		19.	С	[ess]		30.	Ь	[soft sign]
9.	З	[zeh]		20.	Т	[teh]		31.	Э	[eh]
10.	И	[ee]		21.	У	[oo]		32.	Ю	[yoo]
11.	Й	[y]		22.	Ф	[eff]		33.	Я	[yah]

*X does not have a comparable sound in English. Think of this sound as a harsh sounding English “h.” The “ch” in the German “ich” or the “ch” in the Scottish pronunciation of “loch” are also analogous.

Letters not used in RS ISS acronyms have been shaded dark gray.

Unpacking the Russian Alphabet

One way to navigate the Russian alphabet more readily is to group its letters into three general categories:

- 1. “True” vs. “False” Friends**
- 2. Letters Corresponding to the Greek Alphabet**
- 3. Letters with No Recognizable English or Greek Elements**

“True” vs. “False” Friends

“True Friends”

These letters *look and sound essentially the same* in both Russian and English:

Russian Letter	Name and Pronunciation
A	[ah]
K	[kah]
M	[emm]
O	[oh]
T	[teh]

“True” vs. “False” Friends

“False Friends”

While these letters *look* the same as English letters, they have *different sound values* in Russian:

Russian Letter	Name and Pronunciation
B	[veh]
E	[yeh]
H	[enn]
P	[err]
C	[ess]
Y	[ooh]
X	[hah]

Letters Originating in the Greek Alphabet

These Russian letters derive from the Greek alphabet. The considerable number of shared elements demonstrates the close connection between its writing system and the Russian writing system. (Note the overlap between the letters shown here and on the previous two slides.)

Russian		Greek		Russian		Greek	
<i>Letter</i>	<i>Name</i>	<i>Letter</i>	<i>Name</i>	<i>Letter</i>	<i>Name</i>	<i>Letter</i>	<i>Name</i>
А	[ah]	Α	alpha	Π	[peh]	Π	pi
Г	[geh]	Γ	gamma	Ρ	[err]	Ρ	rho
Д	[deh]	Δ	delta	Τ	[teh]	Τ	tau
К	[kah]	Κ	kappa	Υ	[oo]	Υ	upsilon
Л	[ell]	Λ	lambda	Φ	[eff]	Φ	phi
М	[emm]	Μ	mu	Χ	[hah]	Χ	chi
О	[oh]	Ο	omicron				

Letters with No Recognizable Elements from English or Greek

<i>Letter</i>	<i>Name</i>	<i>Letter</i>	<i>Name</i>	<i>Letter</i>	<i>Name</i>
Б	[beh]	Й*	[y]	Ы	[i]
Ё*	[yoh]	Ц	[tseh]	Ь	[soft sign]
Ж	[zheh]	Ш	[shah]	Э	[eh]
З	[zeh]	Щ	[sshah]	Ю	[yoo]
И	[ee]	Ъ	[hard sign]	Я	[yah]

1. Letters with dark gray shading are not used in acronyms as they can never begin a word in Russian.
2. Two other letters, Ё and Й, shown in light gray shading, are letters not used in the acronyms we will study.

Commonly Confused Letters

Russian Letters Can be Easily Confused When Appearing Adjacent to One Another in an Acronym

Have a look at the letters below:



Any guesses what the cause of the problem might be?

Commonly Confused Russian Letters

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These letters share several structural similarities:

- one vertical and one horizontal line: **Г, Т**
- two vertical lines connected by a single horizontal or diagonal line: **И, Л, Н, П, Ц**
- two vertical lines connected by two horizontals: **Д**
- three vertical lines connected by a single line at the bottom: **Ш, Щ**

In printed texts, they will appear adjacent to one other making them more difficult to distinguish. The 10 letters above, when placed right next to one another look like this. Even a native speaker of Russian would need to slow down some to take this all in:

ГДИЛНПТЦШЩ

Examples

These acronyms, drawn from our materials, are given both as they normally appear in a text and then with spaces between the letters so they can be seen more clearly:

КЦП (К Ц П)	РЩП (Р Щ П)
<i>Central Post Computer</i>	<i>Positive Power Distribution Panel</i>
НИП (Н И П)	ИНПУ (И Н П У)
<i>Ground Tracking Stations</i>	<i>Integrated Control Panel</i>
ТКГ (Т К Г)	БНП (Б Н П)
<i>Cargo Transport Vehicle (Progress)</i>	<i>Portable Air Repress Unit</i>

Become mindful of these letters and how they are formed, paying special attention to the relationship between the vertical, horizontal and diagonal lines in each. Use the list above for practice.

Commonly Confused Pairs of Letters: X/Ж

X**Ж**

The first letter looks like English **X**, while the second is unlike anything in English. They are structurally similar in that **Ж** resembles **X** with an extra vertical line through its middle and serifs at the top of **Ж**. The sound each letter makes, however, are quite distinct:

X = hard “h,” while **Ж** = “zh”

Hint: When looking at either of these letters, observe whether or not there is a straight vertical line down the middle. This is the main graphic detail that distinguishes **Ж** from **X**.

Commonly Confused Pairs of Letters: 3/Ə

3

Ə

These two letters, upon first glance, look very similar. Note, however, that the letter 3 (z) looks a lot like the number 3, with two curves on its right-hand side. Ə (eh), on the other hand, consists of only one large rounded curve. Additionally, the sound values of these two letters are quite different, which can also serve as a reminder.

3 (z) is a consonant, while Ə (eh) is a vowel.

Hint: Remember that 3 looks like the number 3 (with two curves), while Ə has only one.

Commonly Confused Pairs of Letters: П/Л

П

Л

П and Л have very similar structures.

Note, however that the left “leg” of Л is thinner and has a hook at its beginning.

Alphabet Bingo!

- This exercise is for practicing visual and aural identification of the names of Russian letters used in ISS RS acronyms. The next 4 slides each contain a single bingo card. The card on each slide is different. Note that all students have an identical set of cards.

For this exercise, please use the hardcopy version (pp. 17-18) of the bingo cards in the textbook (there will be 2 on each page).

- We will work on only one card at a time. When the instructor calls out a letter, mark the square containing that letter.
 - ❖ Suggestion: Since cards in this set may get used more than once, make your marks to the side of the square or use pencil so it can be erased.
- When you have a vertical, horizontal, or diagonal row marked full, shout out “BINGO!”
- This should occur simultaneously for the entire class, since everyone has identical bingo cards.

Alphabet Bingo 1

	Б	И	Н	Г	О
1	Ч	П	Н	З	Ш
2	Р	А	У	Е	О
3	В	Д	Г	К	Т
4	Ц	Х	Б	Л	Ю
5	Ф	Э	И	Ж	Я

Pronunciation of Letters Based on Their *Sounds in Spoken Russian*

Letter	Name	Letter	Name	Letter	Name
1. А	[ah]	12. К	[k]	23. Х	[hard “h”]
2. Б	[b]	13. Л	[l]	24. Ц	[ts]
3. В	[v]	14. М	[m]	25. Ч	[ch]
4. Г	[g]	15. Н	[n]	26. Ш	[sh]
5. Д	[d]	16. О	[oh/ah]	27. Щ	[ssh]
6. Е	[yeh]	17. П	[p]	28. Ъ	[hard sign]
7. Ё	[yoh]	18. Р	[r]	29. Ы	[ɨ]
8. Ж	[zh]	19. С	[s]	30. Ь	[soft sign]
9. З	[z]	20. Т	[t]	31. Э	[eh]
10. И	[ee]	21. У	[oo]	32. Ю	[yoo]
11. Ы	[y]	22. Ф	[f]	33. Я	[yah]

Hey, is that a Vowel or a Consonant?

- Knowing the difference between a vowel and a consonant can be very helpful in determining how to express an acronym orally.

Vowels

- A **vowel** (in any language) is pronounced with an open vocal tract and no build-up of air pressure above the vocal cords.
 - ❖ In layman's terms, we can say vowels are sounds that can be sung. In English, for example, we can sing “a,” “e,” “o,” etc.
- Vowels form the nucleus of syllables in most languages. Russian has 10 vowels that can be systematically paired for hardness/softness. (Vowels that are shaded out are not used in the acronyms covered here):

Hard	А	О	Э	У	Ы
Soft	Я	Ё	Е	Ю	И

With the exception of the last pair, soft vowels are pronounced as their hard versions, but begin with an “y” onglide, as in “yogurt.”

Hey, is that a Vowel or a Consonant?

Consonants

- **Consonants**, on the other hand, are formed by making an obstruction to the flow of air by the teeth, lips, or tongue. We cannot, for instance, sing “K,” “L,” “B,” etc.

Why this is important...

- When an acronym is pronounced as a word, there is usually an alternation of vowels and consonants.
- Being able to identify vowel from consonant, you (with practice) will be able to gain a better idea of how an acronym is spoken just by looking at it.

Acronym Pronunciation Practice I

Some Commonly Used Russian Acronyms

- These acronyms are drawn from both aerospace and non-aerospace sources. Besides practice, this group will help illustrate the differences that can appear between the acronym as written vs. the acronym as pronounced.

For this exercise:

- 1. Repeat after the instructor as each acronym is spoken (we'll go through all the acronyms in this group)*
- 2. Individual students will then say one on their own, in an order determined by the instructor*

Basic Acronym Pronunciation Practice

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Russian Acronym	Pronunciation		English Acronym or Word	Acronym Unpacked
	Letter-by-Letter	Actual		
1. СМ	ess em	ess-em	SM	[Служебный модуль] [Service Module]
2. ГЭС	geh eh ess	gehss	hydroelectric station	[Гидроэлектрическая станция] [Hydroelectric Station]
3. ЦРУ	tseh err ooh	tseh-er-ooh	CIA	[Центральное разведывательное управление] [Central Intelligence Agency]
4. КГБ	kah geh beh	kah-geh-beh	KGB	[Комитет государственной безопасности] [Committee for State Security]
5. МГУ	em geh ooh	em-geh-ooh	Moscow State University	[Московский государственный университет] [Moscow State University]

Practicing ISS RS Acronym Listening and Pronunciation

Basic ISS RS Acronyms-1

	Acronym	English	Basis for Russian Acronym
1.	ACC	Message Acquisition Equipment	Аппаратура сбора сообщений
2.	БВС	Onboard Computer System	Бортовая вычислительная система
3.	БРК	Onboard Radio Complex	Бортовой радиотехнический комплекс
4.	ВГК	Internal Thermal Control Loop	Внутренний гидравлический контур
5.	ВКД	Extravehicular Activity (EVA)	Внекорабельная деятельность
6.	ДУ	Propulsion System	Двигательная установка
7.	И _н ПУ*	Integrated Control Panel	И нтегрированный пульт управления

*Note the use of a lowercase letter here; the «н» is the second letter of the first word.

Basic ISS RS Acronyms-2

	Acronym	English	Basis for Russian Acronym
8.	СВО	Internal Lighting System	Система внутреннего освещения
9.	СГО	Sanitary Hygiene Equipment	Санитарно-гигиеническое оборудование
10.	СИТНП	<i>Real Time Guidance Measurement System</i>	<i>Система измерения текущих навигационных параметров</i>
11.	СКВ	Air Conditioner	Система кондиционирования воздуха
12.	СКГС	Interface Leak Check System	Средства контроля герметичности стыка
13.	СОГС	Atmosphere Revitalization System	Средства обеспечения газового состава
14.	СОЖ	Life Support System	Система обеспечения жизнедеятельности

Basic ISS RS Acronyms-3

	Acronym	English	Basis for Russian Acronym
15.	СОСБ	Solar Array Orientation System	Система ориентации солнечных батарей
16.	СОТР*	Thermal Control System	Средства обеспечения теплового режима
<p>* The Russian letter P in this acronym is what is known as a “syllabic R.” This means that a very short, neutral vowel sound, like the “e” in the English word “the,” a short “uh” sound, is pronounced between the T and P.</p>			
17.	СПОПТ	Fire Detection and Suppression System	Средства пожаробнаружения и пожаротушения
18.	СПТР†	Passive Thermal Control System	Средства пассивного термостатирования
<p>† Pronounce this acronym as a word by adding an И between the П and Т: СПИТР.</p>			

The Structure of English and Russian Acronyms: Determining an Acronym's Headword

- ▶ The term “headword” refers to the noun that *anchors* an acronym. *It represents the core object or system which the acronym describes.*
- ▶ In both English and Russian space-related acronyms, the headword is typically the name of a system, device, or process. For example, in “Motion Control and Navigation System,” “**System,**” is the headword, while the other words provide further information about this system.

Headwords in English Acronyms

- ▶ In English, the headword normally (though not always) comes last. This will hold true for both the acronym and the words underlying the acronym, i.e., Motion Control and Navigation **System.**

Headwords in Russian Acronyms

- ▶ In Russian, however, the headword usually *begins* the acronym:
 - ❖ “Motion Control and Navigation System” is rendered in Russian as the “System of Control of Motion and of Navigation”: **Систéма** **управлénия** **двИжéнием** и **навИгáцией**, thus forming the acronym **СУДН**.
 - ❖ Due to the manner in which Russian connects words, “of” is indicated solely by a change in a word’s ending, not by adding a preposition, as in English
- ▶ Since many ISS acronyms denote systems, expect to see a good number of ISS RS acronyms beginning with the **Russian letter С** (**систéма/срédства** = system). Refer back to the workbook, pp. 20-21, acronyms #13-34 for examples.

The Russian Cardinal Numbers 0-10

1. Some acronyms include cardinal numbers. In writing, this presents no problem. But if the acronym is relayed orally, these numbers will be spoken in Russian.
2. The following slide provides a pronunciation guide for the numbers 0-10. This range will more than suffice for the pronunciation of the ISS RS acronyms in our course materials.
3. An approximate equivalent pronunciation has been transcribed into English letters.
4. The syllable of the transcribed number that bears the word stress given in **BOLD**.
5. Word stress is noted in the Russian words with an accent mark, [´] over the appropriate vowel, e.g., “од[´]н.”

Russian Cardinal Numbers 0-10

Number	Russian	Pronunciation	Number	Russian	Pronunciation
0	нуль	<i>nool</i>	6	шесть	<i>shest</i>
1	один	<i>ahdeen</i>	7	семь	<i>syem</i>
2	два	<i>dvah</i>	8	вóсемь	<i>vohseem</i>
3	три	<i>tree</i>	9	дéвять	<i>dyeveet</i>
4	четы́ре	<i>chetyreh</i>	10	дéсять	<i>dyesheet</i>
5	пять	<i>pyat</i>			

CRONUS I

Command and Data (БВС, СУБА, СБИ, etc.)

Acronym		English	Basis for Russian Acronym
1.	СУБА	<i>Onboard Equipment Control System</i>	<i>Система управления бортовой аппаратурой</i>
2.	СУБК	<i>Onboard Complex Control System</i>	<i>Система управления бортовым комплексом</i>
3.	УПЛУ	Program Logic Control Device	Устройство программно-логического управления
4.	Принято	Copy	<i>Préenyetah</i>
5.	Понял/Понялá (Я) поня́л/понялá	Understood (“got it”) (I’ve) understood	<i>Póhnyel</i> <i>Yah póhnyel</i>

ADCO

Motion Control Group (СУДН, etc.)

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Acronym		English	Basis for Russian Acronym
1.	ГСО	In Attitude	Готовность системы ориентации
2.	ДО	Attitude Thruster Control	Двигатели ориентации
3.	ИКВ	Infrared Horizon Sensor	Датчик инфракрасной вертикали
4.	КД	SM Reboost Engine	Корректирующий двигатель
5.	МИХ	Mass Properties	Массово-инерционные характеристики
6.	Орт	RS Backup Angular Rate Sensor	(name of the device < orthogonal < орт огональ)

ETHOS I

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Life Support, Internal Thermal (COЖ, COTP, etc.), Part 1

Acronym	English	Basis for Russian Acronym
1. ABK	Emergency Vacuum Valve	Аварийный вакуумный клапан
2. АСУ	Toilet	Ассенизационно-санитарное устройство
3. БВК	Vozdukh Vacuum Valve Group	Блок вакуумных клапанов ВОЗДУХ
4. БВС	Onboard Computer System	Бортовая вычислительная система
5. БИТС	Onboard Measurement Telemetry System	Бортовая информационно-телеметрическая система
6. БКО	Purification Column Unit	Блок колонок очистки

ETHOS I

Life Support, Internal Thermal (COЖ, COTP, etc.), Part 8

Acronym	English	Basis for Russian Acronym English Transliteration of Words
43. ЭН	Electric Heater	Электронагреватель
44. ВÓЗДУХ	<i>Vózdookh</i> Russian CO2 scrubber	[Vóhz-dookh] система очистки атмосферы от углекислого газа
45. ЭЛЕКТРО́Н	<i>Elektrón</i> Russian Oxygen generator	[Ehleektróhn] система кислородообеспечения ЭЛЕКТРОН

ETHOS II

Emergency, Part 6

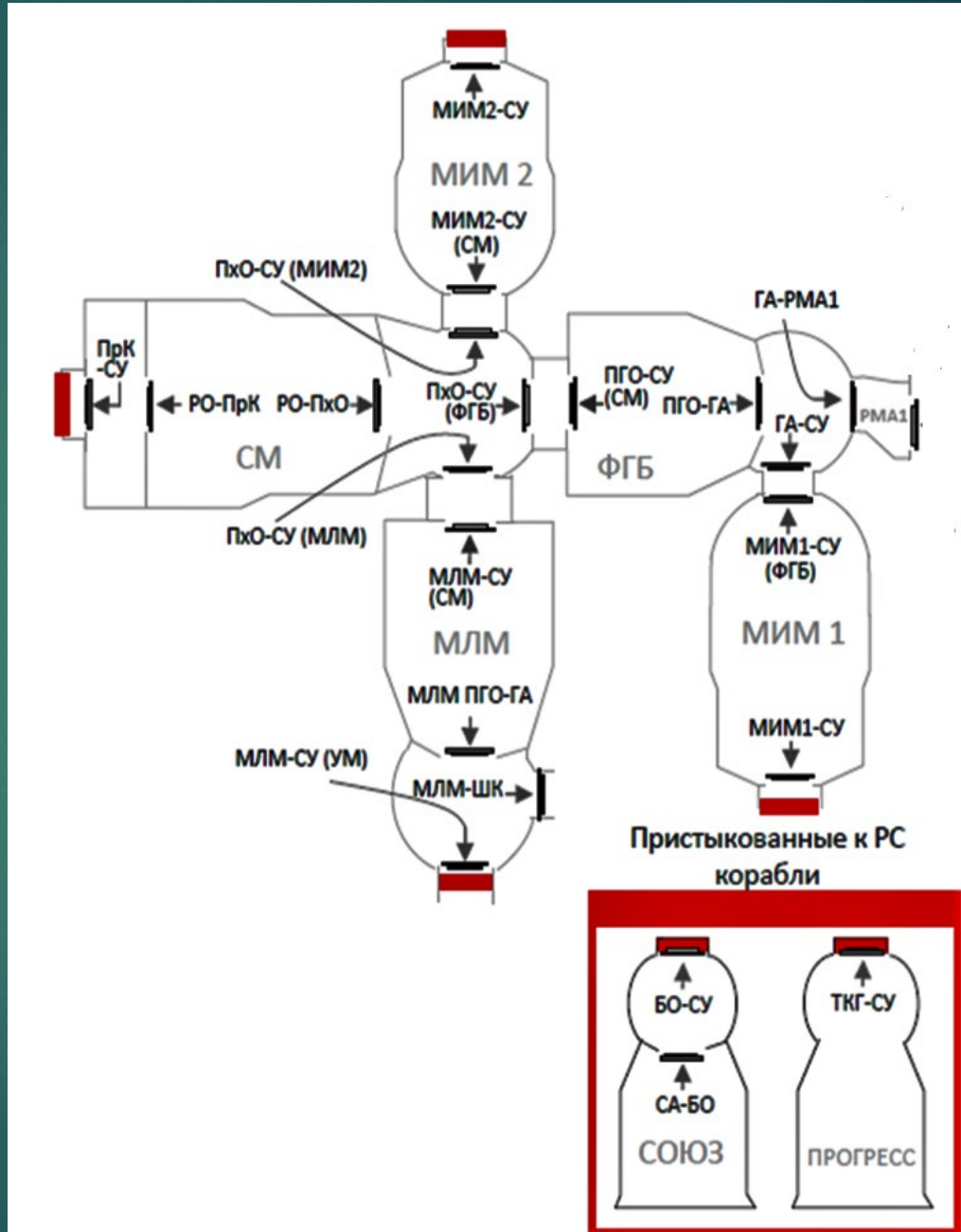
58

Acronym		Transcribed Pronunciation	English
1.	пожáр	[pahzhahr]	Fire
2.	разгерметизáция	[rahss-geer-mee-tee-zahts-eeyah]	Depress
3.	дым	[dym]	smoke
4.	токсическая атмосфэра	[tahk-see-ches-kahyah ahtmahhsfyehrah]	toxic atmosphere
5.	аммиáк	[ahm-mee-yahk]	ammonia
6.	люк	[lyook]	hatch
7.	авáрия	[ahvahreeyah]	Emergency
8.	утéчка	leak	[ooh-tyech-ka]

ISS RS Hatch Names by Module

Schematic of Locations for ISS RS Hatches

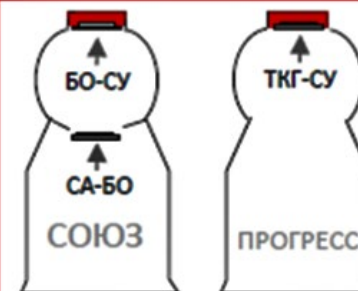
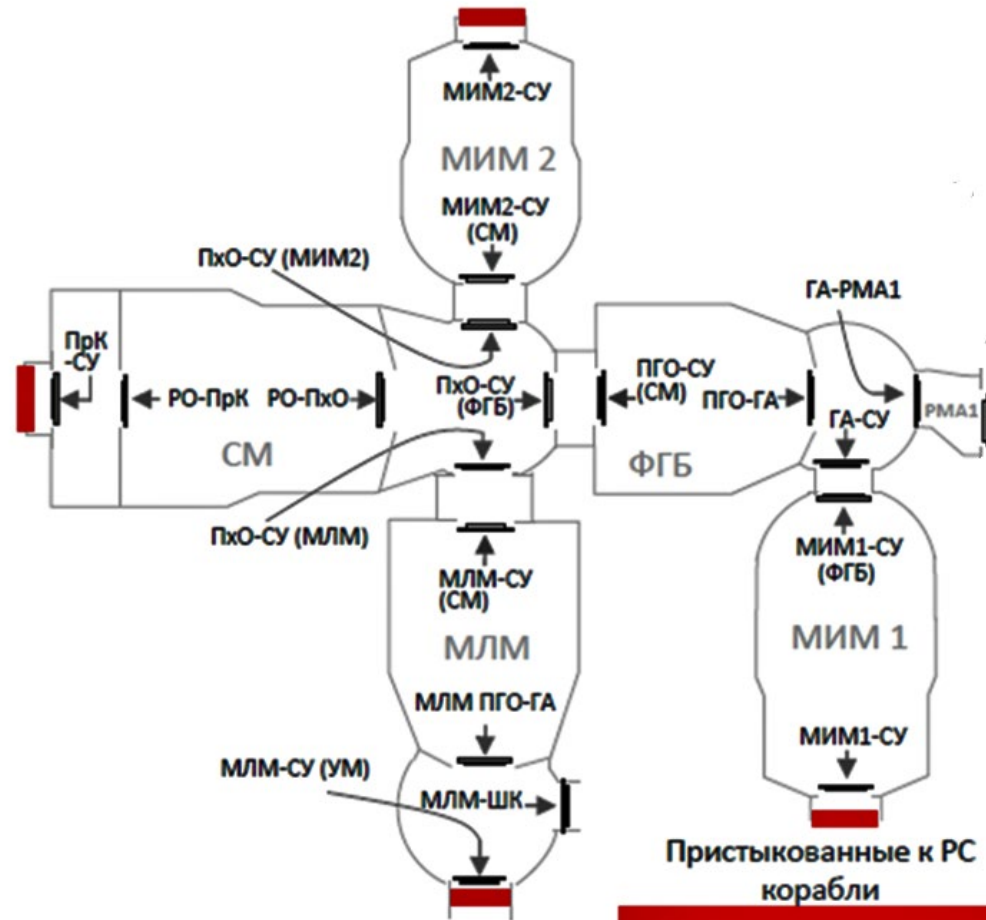
Which acronyms are repeated?



Schematic of ISS RS Hatches with Acronyms

Which hatches would you have to pass through to get from:

1. МИМ2 to СМ
2. МЛМ to СМ
3. СМ to ФГБ
4. ФГБ to РМА1
5. МИМ1 to ФГБ
6. МИМ2 to МИМ1
7. РМА1 to СМ
8. МЛМ to РМА1
9. СМ to МИМ1
10. ФГБ to МЛМ
11. РМА1 to МИМ2
12. МИМ1 to МЛМ



Can you Hear It??

The audio clips below are from air to ground communications during different phases of Soyuz operations. Each clip is labeled with the acronym(s) or words contained therein. Listen carefully for each acronym. Remember that audio quality in these comm circumstances is often less than ideal. Each clip will be played several times.

Н-2 (x2) ИНПУ

ТВС вас понял

Принято ОДР КРЛ (twice each)

ДУ САС

ССВП (x2) Д-9

ЦУП-Москвы СО КДУ принято

КВД СА-БО КР-3 СА

ЦУП-Москвы БВС

ТС-4 ДПО* РУО РО АК принято

ИКВ 2 1

ЛСК АСФ-1 ГСО 1, 2, 3, 4

*How many times do you hear the acronym ДПО in this clip?

Answer Key

Appendices

Appendix 1: Acronyms from Reading Practice II with Literal English Translations

These acronyms lists are identical to those presented on pp. 26-34. They differ only in that they provide a literal English translation of the Russian upon which the acronym is based. If the English translation in the far left column is the identical to the literal translation of the Russian, then no alternative is offered. When there is a difference, the literal English rendering is given in brackets in smaller type face beneath the Russian phrase. Mostly, you will notice a change in word order. In a few instances, some of the words will be slightly different. On occasion, Russian will use a singular noun, whereas English uses a plural noun and vice versa. Lastly, the word stress has been provided on the Russian words for the more adventurous who might want to attempt to pronounce the Russian phrases.

A. General (MCC-M, Modules, etc.)		
Acronym	Russian + Literal English Translation	English
1. ЦУП-М	Центр управления полётами, Москва [Center of control of flights, Moscow]	Mission Control Center, Moscow (MCC-M)
2. СРП	Смѐнный руководитель полѣта [Shift director of flight]	Shift Flight Director, MCC-M
3. ПРП	Помощник руководителя полѣта [Deputy of the director of flight]	Deputy Flight Director
4. Главный [Glahvnee]	Главный оператор [Chief flight controller]	“Glavny” Moscow Capcom Counterpart
5. МКС	Международная космическая станция	International Space Station (ISS)
6. РС	Российский сегмент	Russian Segment

Acronyms from Textbook with Both Literal (and Functional) Translations of the Russian Acronym (Appendix 1)