Phraseology Conflict

SID/STAR – Report on Potential Misunderstanding

IATA

International Federation of Air Line Pilots' Associations
IFALPA
The Global Voice of Pilots

2nd Edition

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SID/STAR—Report on Potential Misunderstanding

International Air Transport Association
Montreal—Geneva

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Introduction

In November 2007, ICAO issued an amendment to PANS-ATM Document 4444 that included new procedures and phraseologies for SID/STAR. The revised ICAO procedures related to published altitude restrictions on Standard Instrument Departures (SIDs) and Standard Terminal Arrival Routes (STARs) set out in pans ATM DOC 4444, represent inconsistent implementations of SIDs/STARs provisions globally as well as a significant changes to the way Pilots and/or Air Traffic Controllers (ATCs) are expected to respond to climb/descend instructions while following a SID or a STAR. It became apparent that the inconsistency of implementation and application of this revision led to interpretations of the phraseology, which in turn led to assumptions being made by the Pilots and/or ATCs.

In an effort to identify potentially confusing phraseology terminology used in SIDs and STARs clearances. The International Air Transport Association (IATA) and the International Federation of Air Line Pilots' Associations (IFALPA) jointly prepared a follow-on survey from the original 2011 Phraseology Survey. This survey was sent out to pilots in an attempt to evaluate the risks associated with the way SIDs/STARs are depicted on procedural charts; the phraseology used by ATC when issuing a clearance on SIDs/STARs; how these clearances may be interpreted by Pilots and the interpretation of amended or revised clearances vs. the original filed clearance.

The use of “Aviation English” was explicitly excluded from the report as this issue has been managed through other venues. The survey was designed to identify areas where the use of SID/STAR phraseology has been, or continues to have the potential, to be misunderstood.

Executive Summary

This SIDs/STARs Phraseology Survey was directed by the IATA Flight Operations Group (FOG) and supported by the IATA Safety Group (SG) as a means of a new study, collating Pilots' input on the use of ATC clearances that require compliance with the procedure's lateral path, associated speed restrictions, and altitude restrictions published on the SID or STAR.

This study aims at the initial evaluation of the risk associated with the way SIDs/STARs are depicted on procedural charts; the phraseology used by ATC when issuing a clearance on SIDs/STARs, such as "Climb via except maintain FLXXX" and how it is interpreted by Pilots; the interpretation of amended clearances vs. original filed clearances are easily misunderstood.

IATA, in collaboration with IFALPA, conducted this study. The scope of the study was focused on misinterpretations related to ATC clearances for SIDs and STARs. A first step in reducing the incidence of misinterpretation problems is to identify the types of events and locations where they occurred. This survey organized within that framework to identify categories of events. Such identifications were detected:

- The need to improve chart depiction of Altitude Restrictions on Standard Terminal Arrival (STAR) and Standard Instrument Departures (SIDs).
- Pilots operating on a SID or STAR which includes level restrictions published in association with specific waypoints must always comply with the level restrictions as published unless such restrictions are explicitly cancelled by ATC.
- Pilot compliance with SID and STAR altitude assignments is important
- The importance of ATC/Pilot read back
- The need to harmonize the use of standard phraseology such as
    - CLIMB TO FLIGHT LEVEL
    - "CLIMB VIA/DESCEND VIA" (Where level restrictions apply)

This report presents the analysis of 1,082 Pilots survey responses. It was notable that there was a reduced number of responses from participants in regions where English was not the principal language.

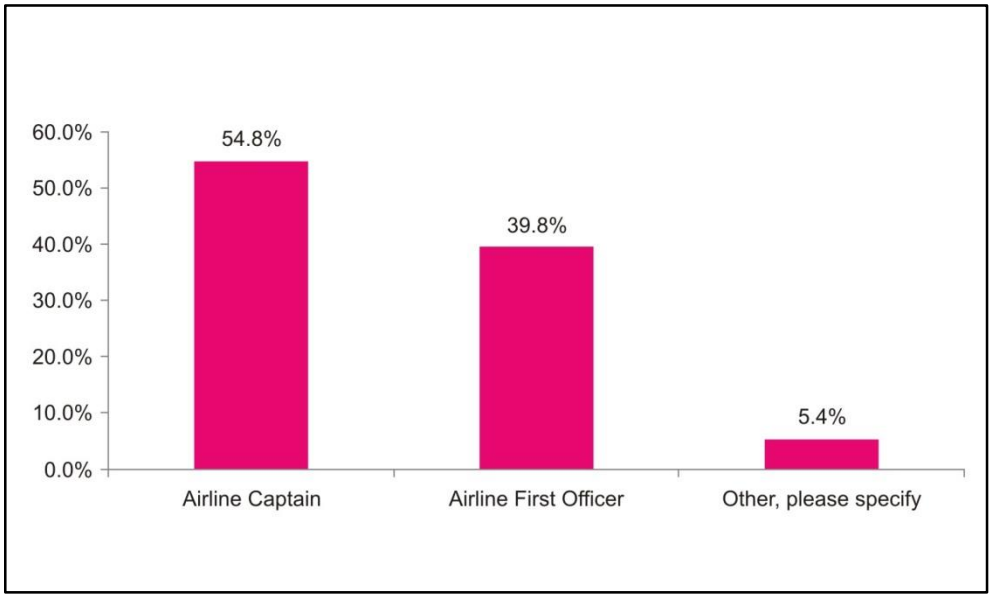
Contents

This report presents the analysis and results of the study on communication related safety risks in the content of SIDs/STARs phraseology.

- Results of the survey responses that were offered by Pilots in the survey questionnaire
- Quotes extracted from the survey. The responses are written verbatim, without any attempt to correct the language.
- Conclusions
- Regional differences and analyses were made using the IATA regions, as shown in Appendix A to this report.
- Online questionnaire used in the survey targeting all Pilots, as shown in Appendix B.

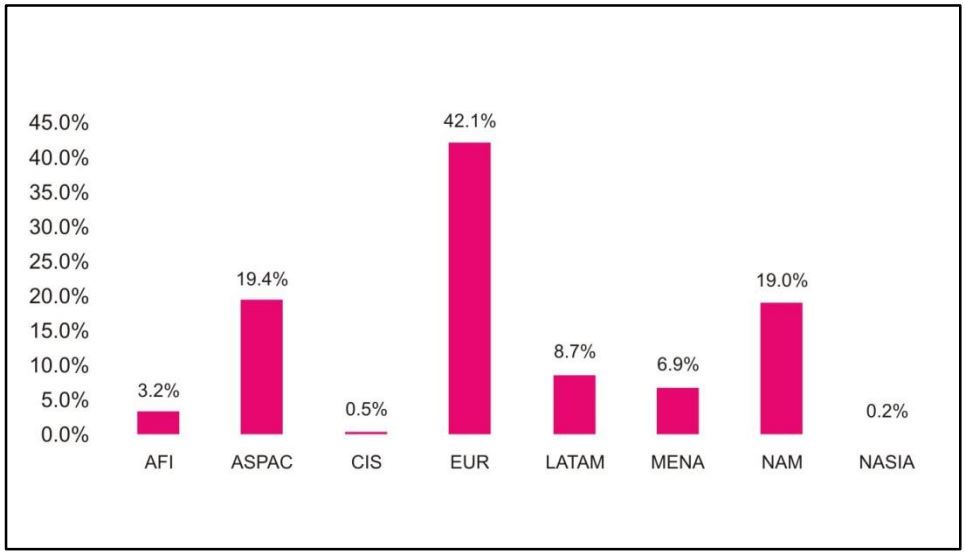
Section 1—Survey Analysis

Question 1 – 'I am an': The purpose of this question was to identify the flying qualification of the individual completing the survey. The results revealed that of the 1,082 contributions received, 54.8% (593 responses) were Airline Captains, 39.8% (431) were Airline First Officers and 5.4% (58) were others including Air Traffic Controllers, Control Tower, Air Traffic Control Officers, Airline Second Officer, Safety Officers, Senior Management, etc… There were no set targets for either Captains or First Officers and this representation is quite adequate for the purpose of this study.



Question 1: I am an

Question 2 – 'I am based or primarily conduct operations in this region' 'I am based or primarily conduct operations in this region': The regional composition of the survey participants had to be taken into account when drawing conclusions from the survey. Of the 1,080 responses, 42.1% (455 responses) were based or primarily conduct operations in Europe (EUR), followed by 19.4% (209) from Asia Pacific (ASPAC), and 19% (205) from North America (NAM); however, North Asia (NASIA) and Commonwealth of Independent States (CIS) did not participate in the numbers originally expected. Respondents from Africa (AFI), Middle East and North Africa (MENA) Latin America and Caribbean (LATAM), together with North Asia (NASIA), and Commonwealth of Independence States (CIS) regions provided the balance data.



Question 2: I am based in

The regional differences and analyses were made using the IATA regions, as shown in Appendix A to this report.

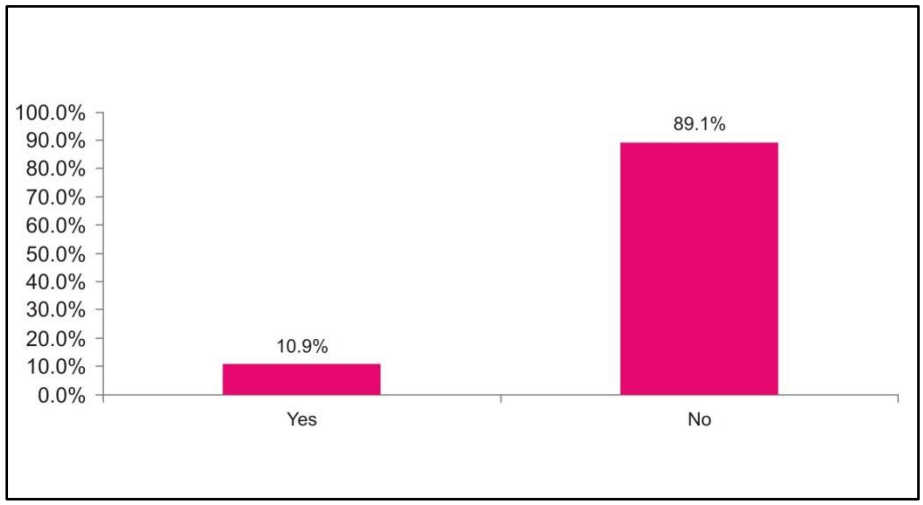
Table 1 shows the breakdown between Airline Captains, First Officers and others regional composition amongst those who responded to the survey.

Region	Airline Captain	Airline First Officer	Others	Total Responses
AFI	17	10	8	35
ASPAC	127	74	8	209
CIS	4	1	0	5
EUR	227	190	38	455
NAM	121	83	1	205
NASIA	2	0	0	2
LATAM	51	40	2	93
MENA	41	32	1	74

Table 1: Regional distribution of Airline Captains and Airline First Offers

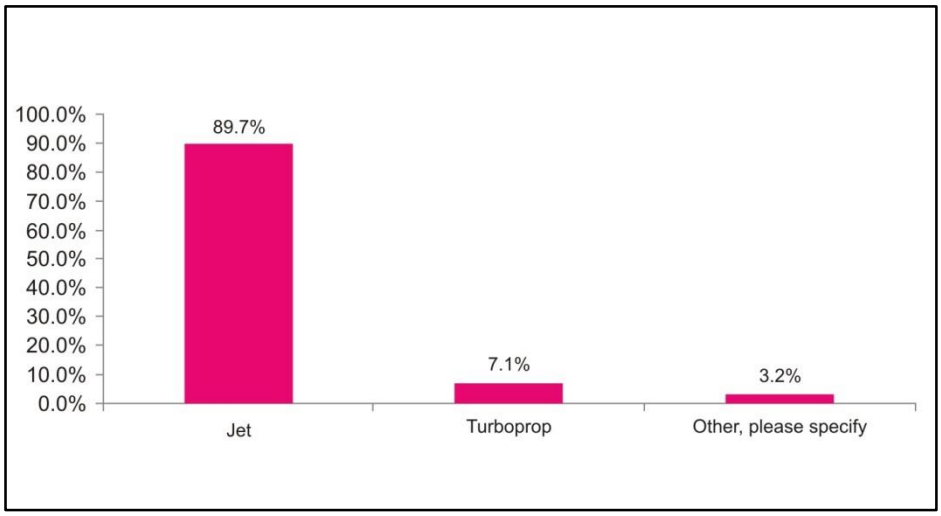
Question 3 – 'I have participated in a previous phraseology study sponsored by IATA, IFALPA, and IFATCA': It was important to evaluate and know if the participants of this survey actually participated in the previous one (2011-Pilots/Air Traffic Controllers Phraseology Study) which was published as a first edition in collaboration with IFALPA and the International Federation of Air Traffic Controllers' Associations (IFATCA). Of the 1,077, the majority of responses 89.1% (960) responded negatively, while only 10.9% (117) provided a positive reply. Since the majority of respondents have not participated in the previous phraseology study

sponsored by IATA, IFALPA, and IFATCA, comparing the survey responses from that study with those of this study is meaningless.



Question 3: I have participated in a previous phraseology study sponsored by IATA, IFALPA, and IFATCA

Question 4 – 'What type of aircraft do you mainly fly?': This question identified the types of aircraft operated by respondents. Of the 1,071 participants, the majority of aircraft reported as operated by 89.7% (961) respondents were Jet powered aircraft while 7.1% (76) respondents operated turboprop fleet type and 3.2% (34) were others including, General Aviation, Training and Charter Aircraft, Air Traffic Controllers, Retired Pilots, Helicopter Pilot, Fighter Aircraft, Air Traffic Control Officers or specified as none.



Question 4: What type of aircraft do you mainly fly?

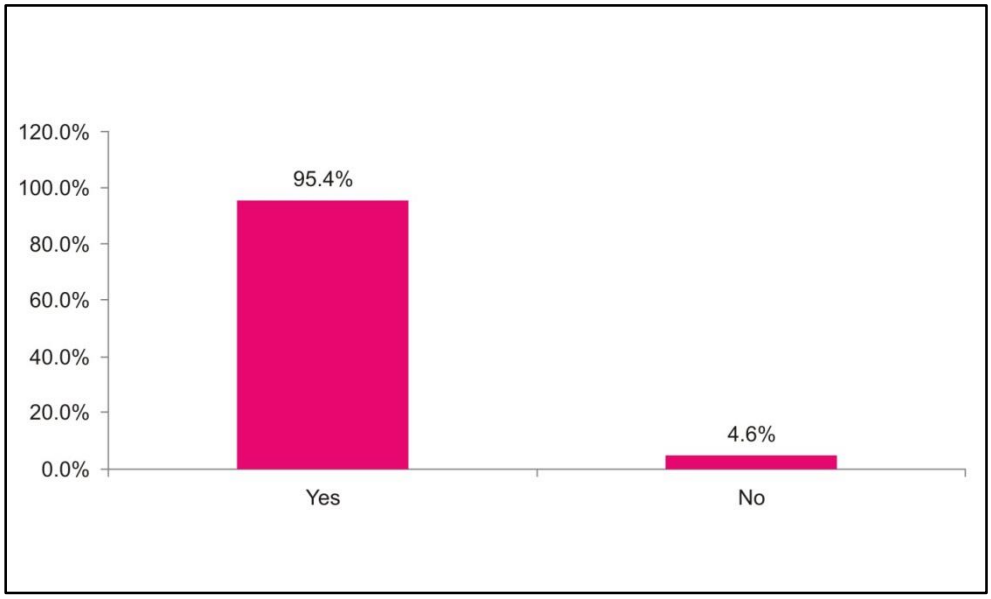
The type of operation flown by airline captains and first officers was further analyzed. Jet pilots were statistically over-represented among respondents. In contrast, airline captains of turboprops were

underrepresented among respondents. While the analysis revealed that 393 respondents were jet airlines first officers. Table 2 illustrates the types of aircraft propulsion operated by Airline Captains and Airline First Officers.

	Airline Captain	Airline First Officer
Jet	550	393
Turboprop	41	35

Table 2: Distribution of respondents by type of aircraft propulsion

Question 5 – 'The aircraft I fly is equipped with a Flight Management Computer (FMC) and Moving Map Display': The objective of this question was to gain a better understanding of the current snapshot of Navigation Databases stored onboard; of the 1,051 responses, most of the participants with 95.4% (1003) indicated that the aircraft type flown by them was equipped with FMC and Moving Map Display, while 4.6% (48) provided a negative response.



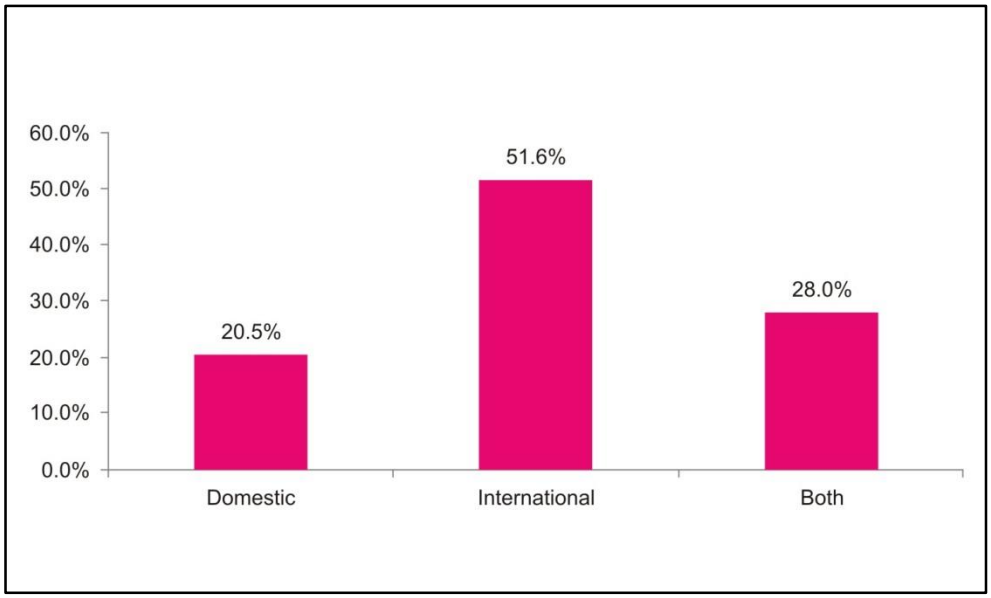
Question 5: The aircraft I fly is equipped with a Flight Management Computer (FMC) and Moving Map Display

Table 3 illustrates the equipage of FMC and Moving Map Display per aircraft propulsion. It was apparent that the aircraft equipage of FMC and Moving Map Display was over-represented in jet fleet than turboprops.

	Equipped	Not Equipped
Jet	944	11
Turboprop	53	23

Table 3: FMC and moving maps per aircraft propulsion

Question 6 – 'My flying is mostly': Of the 1,061 respondents, a bit more than half of the respondents with 51.56% (547) indicated that their airline companies operate to international destinations, or both international and domestic flights (79.6% or 844).



Question 6: My flying is mostly

Furthermore, respondents were primarily airline Pilots flying international operations. The targeted Pilot group was therefore very well represented. The representation of Airline Captains and Airline First Officers operating Domestic, International flights or both is illustrated in the table 4 below.

	Airline Captain	Airline First Officer	Others	Total Responses
Domestic	116	92	8	216
International	310	219	17	546
Both	165	118	14	297

Table 4: Representation of Airline Captains and First Officers operating Domestic or International flights

Table 5 illustrates the breakdown of the survey respondents regionally in terms of their flight operations.

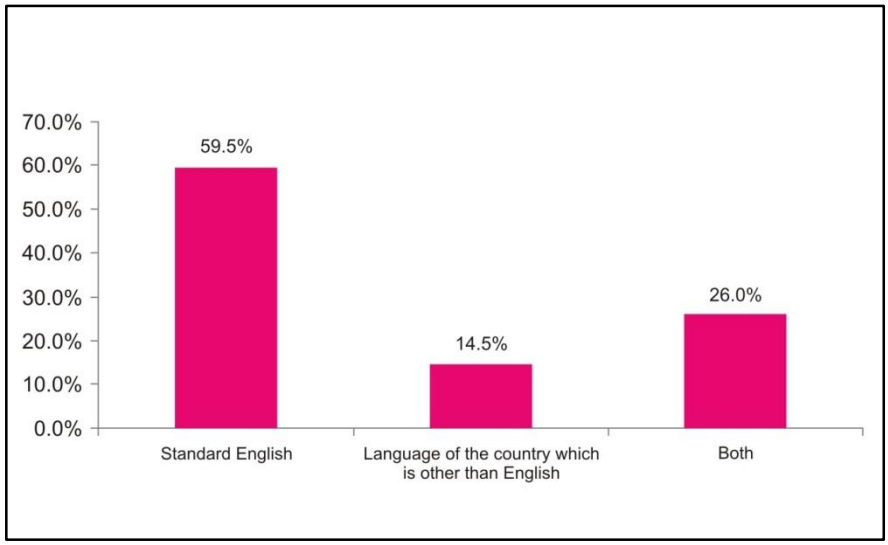
Region	International	Domestic	Both	Total Responses
AFI	5	13	12	30
ASPAC	109	60	40	209
CIS	5	0	0	5
EUR	296	15	128	439
NAM	40	91	73	204

Region	International	Domestic	Both	Total Responses
NASIA	0	0	2	2
LATAM	29	37	28	94
MENA	61	1	13	75

Table 5: Distribution of survey respondents regionally in terms of their flight operations

Question 7 – 'If I am based in a country where English is not the mother tongue, what language is used to communicate?': In many parts of the world, language differences create an additional communication issue which can affect safety performance when controllers use English to communicate with international flights and their local language to communicate with flights by locally-based operators, leading to potential degradation of situational awareness in respect of other traffic.

This question addresses the use of native languages in aviation communication. Of the 921 responses, a good proportion of respondents 14.5% (134) responded that they used a language other than English to communicate at certain times. 26.0% (239) participants indicated that they used both Standard English and the language of the local country.



Question 7: If I am based in a country where English is not the mother tongue, what language is used to communicate?

Mixed languages where international pilots speak English with ATCs and domestic pilots speak the country's language with controllers were one of the mentioned concerns. The representation of Airline Captains and Airline First Officers use of mixed languages is illustrated in the table 6 below.

	Airline Captain	Airline First Officer	Others	Total Responses
Standard English	316	216	15	547
Language of the country which is other than English	69	59	5	133
Both	115	89	35	239

Table 6: The use of mixed languages by Airline Captains and First Officers

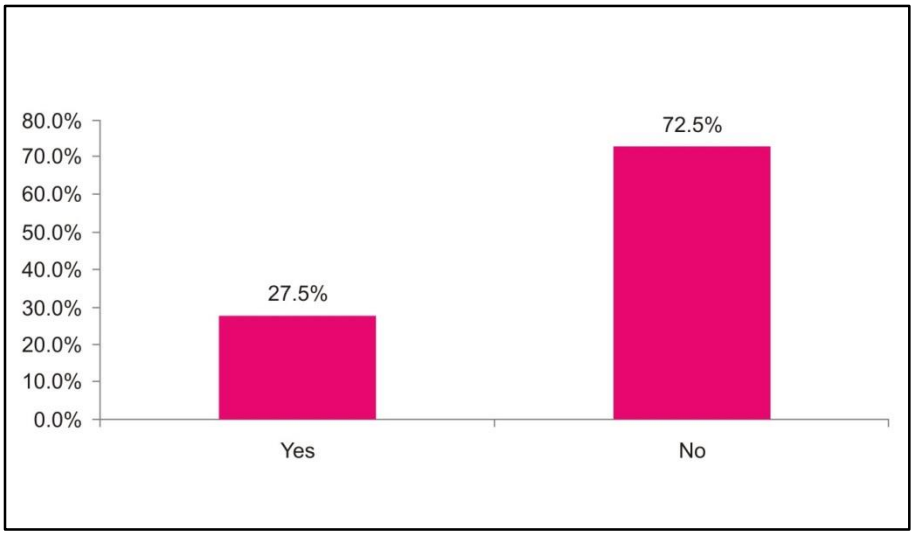
Table 7 illustrates the breakdown of the survey respondents regionally in terms of the use of Standard English and mixed languages.

Region	Standard English	Language of the country which is other than English	Both	Total Responses
AFI	19	1	15	35
ASPAC	111	14	16	141
CIS	2	1	2	5
EUR	238	58	149	445
NAM	104	6	11	121
NASIA	1	1	0	2
LATAM	9	50	35	94
MENA	63	2	10	75

Table 7: The breakdown of the survey respondents regionally in terms of the use of mixed languages

Question 8 – 'This question refers specifically to concerns related to the way SID/STARs are depicted on procedural charts. Is there one particular concern related to way SID/STAR information is depicted on a chart that creates the greatest potential for misunderstanding or errors?': The Standard Instrument Departures (SIDs) and the Standard Terminal Arrival Routes (STARs) are produced with the objective of expediting the safe and efficient flow of air traffic operating to and from the same or different runways at the same or neighboring airfields. The aim of this question was to gain insight on any particular concerns related to the way SIDs/STARs information was depicted on a chart that may create the greatest potential for misunderstanding or errors.

Of the 1,022 participants, 27.5% (281) responded affirmative, while the majority 72.5% (741) responded negatively.



Question 8: Respondents insight on SID/STAR information

A total of 251 provided inputs to this question, most of the concerns were pertaining to Lack of clarity and formatting of SIDs and STARs on charts, lack of consistent depiction of speed and altitude restriction, same SIDs & STARs names for different runways. The examples below have been taken directly from comments made by Pilots answering the survey:

- Altitude constraints are not depicted the same across the charts
- Altitude in meters and feet, even based on QFE or QNH
- Altitude information on STARS is not depicted in a standard way. It's presented differently on different STARS and is sometimes hard to find.
- Altitude is sometimes bold and sometimes not. Makes it harder to find.
- As my company is using LIDO charts, several SID/STAR are depicted on the same chart creating sometimes confusions when we are looking for a particular SID/STAR.
- Ball notes - I spend a lot of time looking for the text
- Ball notes relating to a particular fix
- Block heights for SIDs should be included (always) in the SID description narrative.
- Common similar SID or STAR names depicted in the same chart
- Confusion on top altitude and when to level off
- Depends on the chart not all charts use same format
- Distinguish between RNAV and non RNAV SID and STAR. RNAV SID STAR should have an R in front of the SID name
- Every SID from a particular airport should have the same climb restriction, this would greatly reduce level busts and confusion on flight deck.

- Final altitude limits are small and hard to find, while specific fix restrictions are large and easy to see and interoperate.
- Final altitude not always clearly defined.
- Final altitude published with at or below altitudes hidden within the body of text or plan view.
- Flyover points not always clearly visible, they should be overstated.
- For SIDS required information can be on several different chart pages. For a runway/star assignment it should all be on one page. SIDS are cluttered to the point you can't find crossing restrictions.
- For some airports, the number of different SID/STAR is too high. It's hard to find the correct chart for the cleared SID/STAR timely or sometimes the chart is hard to read due to too much information content.
- Generally no, but I am aware that some SID/STARs appear overly complex in terms of number of waypoints often spaced very closely together
- Having altitudes on the SID profile that are higher than the max altitude in the remarks section
- Height restrictions. Some regions expect altitude restrictions to be maintained even after being given direct routings. This is sometimes not clear.
- Identical names for SID on parallel runways.
- If ATC clears you to an Altitude/FL that is higher/lower than a specific Altitude restriction on the chart does that mean that the specific Altitude restriction can be disregarded?
- In the written description of the departure, "Maintain 18,000" is in the same size font as the rest of the description. When assigned Climb Via, this Top of Climb limitation is very important. The Top Of Climb limitation of the SID should be Boxed and in Bold Type in the Same Location on every SID. Placing the Top Of Climb Box next to the Departure Frequency Box would be ideal. The Top Of Climb should be in Bold Type and Boxed.
- Lack of clarity of step climbs
- Layout in general is often overloaded with info and could be more standardized. Alt restrictions are sometimes nor clear nor practical. With heavy jet and modern equipment we are supposed to fly continuous descends and no low level flights.
- Lido charts: level restrictions (cross higher respectively lower than).
- Multiple STAR/SID on one chart. Altitude restriction requiring ATC approval not different those not requiring ATC approval
- Names of SID/STAR are complicated and sometimes cannot be pronounced.
- SIDs have no problem as they have written explanation but STARs don’t have written explanation and sometimes they can be confusing.
- Some airports have similar sounding named SIDS/STARS
- Speed restrictions are not identified in a standard manner.

- STAR should include angle of descent used to construct the procedure for FMS set up on non VNAV capable FMC's
- The "MAINTAIN" altitude is small and can be in a hard to find location on the chart.
- The Altitude box for both the "Climb Via" and the "Descend Via" should be in the same place on all charts. i.e. the top left corner.
- The cleared level is not always located in the same place on the chart
- The highest altitude for the SID, or the lowest altitude for the STAR, should be depicted in a conventional format, so that all charts depict these altitudes in the same way.
- Too cluttered charts/information
- Too much text clutter grey out important information of speed restrictions and altitude restrictions. Charts should be more concise.
- Too many restrictions. Cannot process all info. Restrictions should be limited to 2 or 3 points
- Top altitude way too small text.
- Yes. The TOP altitude of a SID and the BOTTOM altitude of a STAR should be depicted in a standard location and format -in BOLD font so there is no way to misinterpret this critical piece of information.

Table 8 illustrates the breakdown of the survey respondents regionally expressing concerns with respect to the way SIDs/STARs information is depicted on a chart that may create the greatest potential for misunderstanding or errors of Standard English and mixed languages.

Region	Yes	No	Total Responses
AFI	3	29	32
ASPAC	41	152	193
CIS	2	3	5
EUR	105	331	436
NAM	87	101	188
NASIA	0	2	2
LATAM	17	73	90
MENA	25	48	73

Table 8: The breakdown of the survey respondents regionally expressing concerns related to the way SIDs/STARs information is depicted on a chart

Question 9 – 'Are you aware of misunderstandings, misinterpretations or common errors made when using Pre Departure Clearance (PDC) procedures to obtain SID/STAR clearances?': All pilots must request a pre-departure clearance (PDC) in order to obtain start-up and departure information prior to leaving the gate. Of the 1,062 participants, 21.4% (227) claimed of some cases where PDC clearances led to misunderstanding between the Pilot and the ATC, while the majority 78.6% (8) responded negatively.

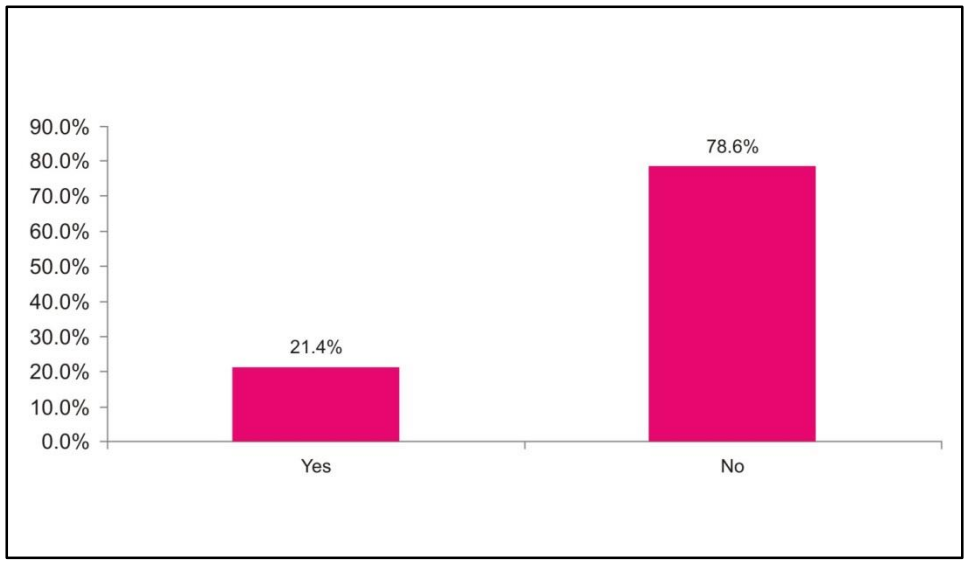


Figure 9: Are you aware of misunderstandings, misinterpretations or common errors made when using Pre Departure Clearance (PDC) procedures to obtain SID/STAR clearances?

If the respondents answered “Yes” to this question, the respondents were invited to provide examples. From their remarks, it was apparent that there were some operational differences depending on Air Navigation Service Provider (ANSP). There were some issues reported associated with PDCs, some were related to phraseology, lack of read back, pronunciation, PDC formatting, etc…Some examples of the 166 cases reported were provided in the table below:

- Absence of a human cross check when parallel runways in use can mean incorrect SID is programmed due to mis-reading of PDC (expectation bias)
- Being give a climb via clearance and then being assigned a lower altitude that is not the charted altitude can cause confusion.
- The initial climb altitude is a challenge when it is just displayed in the text and not on the plan view or PDC.
- Altitude to climb too should be on the PDC even if it is the same as the altitude on the printed SID.
- Ambiguous clearances. Clearance contrary to SID plate. Climb restriction on SID lower level restriction in PDC.
- Amended clearances vs. original filed clearances are easily misunderstood
- Changes in routing beyond SID when changing a SID using PDC.
- "Climb via except maintain 5000." Pilots who do not speak English as their first language might misinterpret this as Climb Via expect maintain 5000.
- Common error: ATC clearance changed: many times it just picks up a point on the original clearance along the route of flight. The route has not changed at all but the clearance wording has. It causes complacency about the words 'changed'. This could cause the flight crews to miss a real route change.
- Communication is often rushed, thus, combined with the expectation the pilot will read back the

clearance correctly many errors, such a squawk codes, clearance misunderstanding are often identified at a critical phase of flight.

- Different ATC facilities use different formatting and require different acknowledgments.
- Format is often mixed up with readbacks not following the same order as shown on PDC. Readback requirements vary too much from State to State.
- I know of at least one case where the PDC stated to maintain 10,000, but the flight was cleared to climb via the SID, which had a higher upper limit altitude. The crew was confused about which clearance to follow and stopped the climb at 10,000. A pilot deviation was issued.
- In the PDC, any Exception should be co-located with Climb Via. The PDC may contain Climb Via listed in the Cleared Route, however the Exception, "Maintain 7,000" is in the free form description at the bottom of the PDC. Any Exception should be co-listed with the Climb Via clearance.
- I've heard a lot of times wrong read back from pilots without any reaction from ATC
- Lack of standard phraseology.
- Language related, some countries have a heavy native accent and clearance misunderstanding results in incidents, even thou the clearances are read back
- Loading flight plan versus PDC clearance. Also, expected runway should be on PDC to reduce errors
- Major issue is the many differing ways in which PDCs are issued; datalink, voice, automatically, via the MFD, etc.
- Many times on the PDC it indicates a revision to our filed flight plan in the "Revised Segment," but upon closer examination, it really is NOT a revised segment even though the PDC states that it is.
- Many errors come from the abbreviated listing of revised clearances, all revisions should have a full route clearance on the PDC
- Mostly related to route amendments that aren't actual changes but simply for ATC handoff. It is a distraction for when there are real changes, especially if this is common at a specific airport when there is an actual change that is overlooked.
- Nonstandard clearance or phraseology and issued two fast with a bad pronunciation
- Nonstandard formatting, filed route vs. Cleared route depiction
- Nonstandard phraseology on the PDC between different airports
- Not reading back the clearance.
- PDC doesn't usually use the term "transition" in the clearance. It only names the transition fix. It should specifically tell you to fly the transition.
- PDC format is changing country to country also accent is sometimes a problem. Readback is not heard back by ATC.
- PDC revisions are challenging... the way the clearances are typed are often difficult to interpret. Also challenging when there is a fix name the same as the procedure name. Hard to distinguish the route/SID.
- PDC says "Cleared as Filed," then lists a route that APPEARS different than filed route. Usually, the PDC indicates a Jet Route to a fix that is different than what the flight plan shows. Typically the next point on the PDC will be a continuation of the filed routing, but it's never 100% clear and leads to confusion. Also, PDCs are presented in a non-standard way. Sometimes you see the full route,

sometimes just the first couple fixes on the route. This should be standardized. Also, the "Climb Via" phraseology needs to be modified. When you only say "Climb Via the SID and don't have an end altitude listed you are running a big risk that us pilots misread the SID. Then we tell ATC we are climbing via the SID, but nobody verifies the altitude we are climbing to...hopefully it's the right altitude, but the system is set up for big mistakes.

- PDCs often include filed AND cleared routes. In my opinion, PDC should include ONLY what is cleared.
- PDC's with route changes are unnecessarily confusing. They should either write AS FILED with the full route or route altered with the full route. The current format only shows the changed portion and not all cites do it the same. IAD is notorious for having confusing PDC's.
- PDC doesn't precise unrestricted if altitude clearance is different from the altitude constraint depicted in the SID.

Question 10 – If you answered yes to question number 9, please identify the region where misunderstandings / misinterpretations or common errors related to SID/STAR clearances obtained using PDC procedures were made': The purpose of this question was to identify the region where misunderstanding, misinterpretation or common errors related to SIDs/STARs clearances obtained using pre-departure clearance (PDC) procedures were made. Of the 247 respondents, the region identified amongst respondents was NAM with 42.1% (104) participants followed by EUR with 24.7% (61) participants.

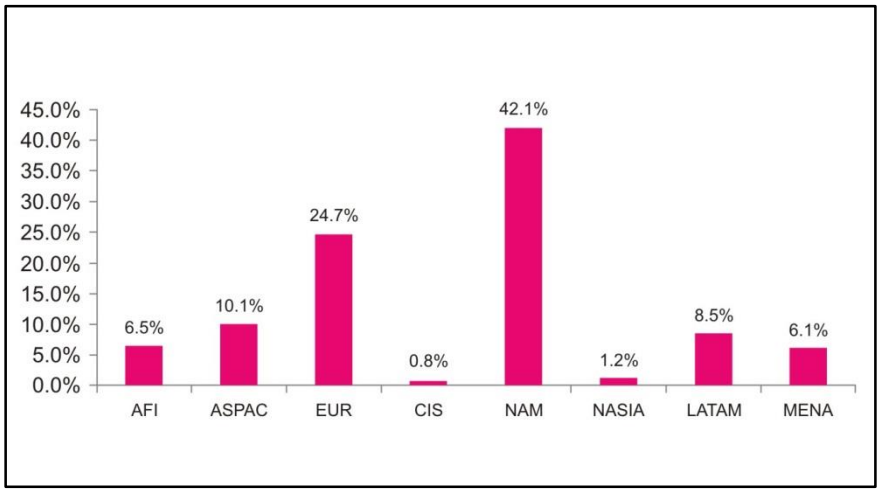
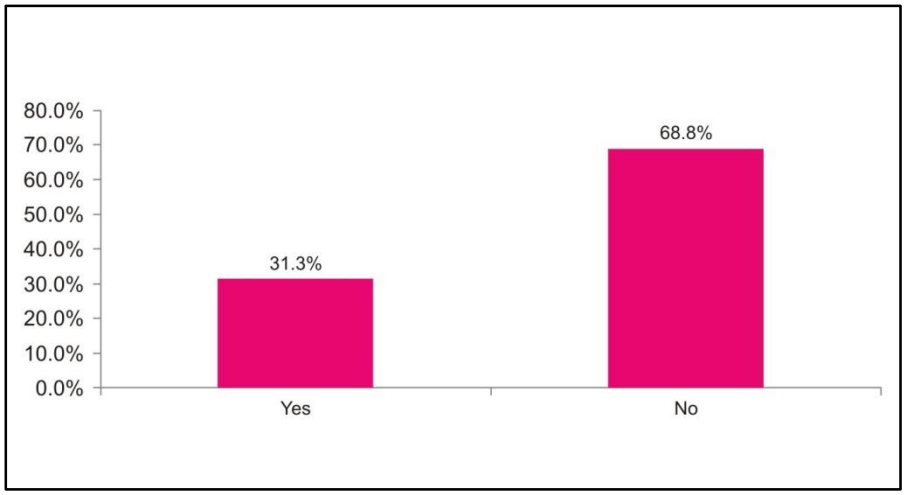


Figure 10: If you answered yes to question number 9, please identify the region where misunderstandings / misinterpretations or common errors related to SID/STAR clearances obtained using PDC procedures were made

Question 11 – 'Are you aware of misunderstandings, misinterpretations or common errors made when receiving a SID clearance over the radio (No PDC procedures available)?': Of the 1,056 respondents, 31.3% (330) participants responded affirmative, while the majority of respondents with 68.8% (726) provided a negative reply that they were not aware of any misunderstandings, misinterpretations or any common errors made when receiving a SID clearance over the radio.



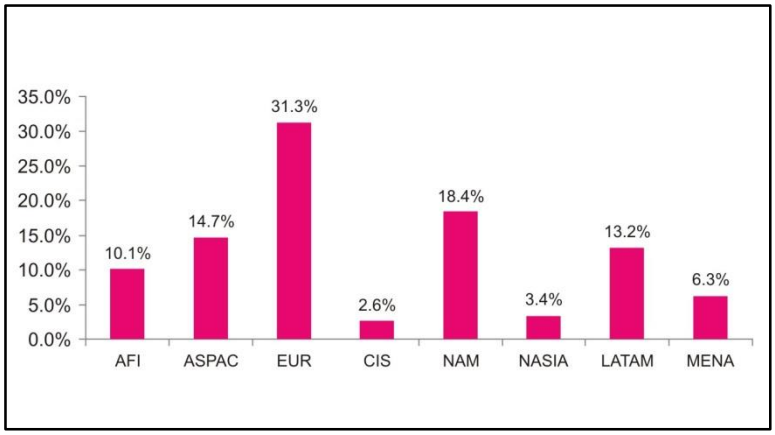
Question 11: Are you aware of misunderstandings, misinterpretations or common errors made when receiving a SID clearance over the radio (No PDC procedures available)?

However, 263 respondents provided comments; examples of those are listed below:

- Accent of the controllers giving the clearance and also when they give it (while taxiing or on the runway)
- Any misunderstanding like with any radio comm possible, but here even more likely: ATC usually assumes that you are familiar with all the names and pronunciation of the departure routes and transition and navaids, but with lengthy and demanding clearances many can just understand what they expect to hear
- ATC clearances should never be given at the moment of pushback or taxi, as the workflow (and background noise) in those phases does not allow for the most careful attention, thus leading to repeating, breaks and misunderstandings.
- A number of departures from airports with almost the same name can be confusing, specially if speech of communicated message is too quick.
- Bad pronunciation! leads to misunderstanding of SID designator, Altitude, Squake...
- Bad radio quality and lack of English skills by the controllers
- Both pilots and controllers are not reading back/issuing climb clearances with standard phraseology
- Controllers are still using old phraseology, ie clearing via the SID but not issuing an altitude or using an altitude that's not depicted on the chart.
- Controllers sometimes talk too fast, making it hard to copy down all correctly.
- Controllers assume we all know all the names and transitions available.
- During the descent procedures, is usual the ATC start to radar vector you without saying the new FL cleared and/or the heading limit
- "Except Altitude/FL" wording used in SID clearance. Great confusion about what is finally cleared or not.

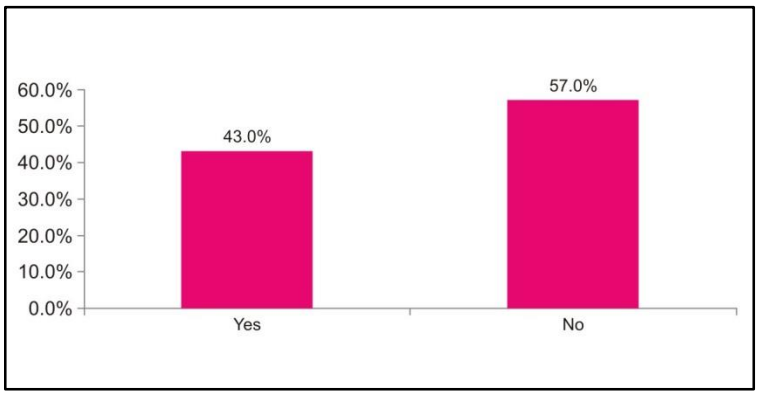
- First altitude given in some airports usually changes after airborne
- General communication difficulties such as different pronunciations or misunderstandings of which SID is to be flown.
- Inability to understand name of SID, wrong format/order of clearance leading to confusion/misunderstanding.
- Language difficulties caused by accents/poor English and multiple similar sounding SID/STAR
- Misinterpretation of figures (letters and numbers).
- Misunderstanding and readback without correction happens regularly
- Misunderstandings of the name of SID, initial ALT, frq...
- Missing or misinterpretation of a single letter could lead to the selection in the FMS of the wrong SID STAR.
- Most cases, controller does not clearly speak the words by ignoring the English language, speak wrong, without properly accent concerned to de language. They speak like they speak their Mather language. Sometimes this is not English.
- Mixups between multiple departures from one runway to a common fix or between departures from different runways bearing the same name
- Non standard phraseology.
- Normally confusions between designated SID's names. Spelling/Interpretation errors.
- Not always clear whether speed restrictions need to be adhered to or not. Not always cleared what correct procedure is in case you are unable to comply with max or min speeds due to aircraft performance or limitations.
- Often the need to adhere to intermediate altitudes is not made clear.
- Problems related to FL and restrictions.
- Selecting the wrong SID on the FMC when SID is issued during the taxi-out phase and the SIDs are numerous and the layout complex.
- SID given in ATC clearance with an altitude then a change just before t/o with other altitude.
- The problem is that every airport has à specific procedure which sometimes is confusing.
- Use of the English words to "two" and for "four"
- When vectored off a SID, there is often misunderstanding about what speeds to fly and altitude constraints.
- Wrong SID selected on the FMC
- Wrong SID identification, incorrect assign first altitude, incorrect readback without correction from ATC.

Question 12 – 'If you answered yes to question number 11, please identify the region where misunderstandings / misinterpretations or common errors related to SID clearances received over the radio prior to departure were made': The purpose of this question was to identify the region where misunderstanding, misinterpretation or common errors related to SID clearances received over the radio prior to departure were made. Of the 348 respondents, the region identified the most amongst respondents was EUR with 31.3% (109) participants followed by NAM with 18.4% (64) participants.



Question 12: If you answered yes to question number 11, please identify the region where misunderstandings / misinterpretations or common errors related to SID clearances received over the radio prior to departure were made

Question 13 – 'Are you aware of misunderstandings, misinterpretations or common errors made related to the Cleared Level or final altitude to be maintained when issued a SID or STAR?': Of the 1,051 respondents, 57.0% (599) responses indicated that they did not encounter any misunderstandings, misinterpretations related to ATC instructions using the phrases "Cleared Level or final altitude to be maintained" for a SID or STAR clearance. 43.0% (452) responses indicated a misunderstanding between pilots and controllers with respect to phraseology used by ATC clearance and instructions for SIDs and STARs.



Question 13: Are you aware of misunderstandings, misinterpretations or common errors made related to the "Cleared Level" or final altitude to be maintained when issued for a SID or STAR?

- A lot of SID there's a change of ATC frequency, sometimes busy, and the SID doesn't have initial altitude but it has constrains
- A SID with multiple runway transitions that have different bottom altitudes. Sometimes it's hard to easily find what altitude to descend to.
- About the use of term "via" or absence of this term.
- Altitude related to a specific waypoint"
- APP control using "climb direct to FL" not specifying if is VIA or disregarding the altitude constraints.
- Applicability of altitude restrictions when cleared to fly the procedure
- ATC gives a climb clearance, which conflicts with SID restrictions.
- Cleared Level higher than an altitude restriction
- Cleared to an altitude higher than the restriction issued.
- Climb restrictions active or not
- Climb via with an altitude clearance that differs from the SID, either lower or higher.
- Common errors would be climbing/descending to a cleared level after departure without complying with SID/STAR published constraints since ATC has assigned the new level without bearing in mind that the word "unrestricted" was omitted.
- Confusion regarding differences between ICAO and US rules regarding intermediate altitude restrictions.
- Crew is unsure if they should adhere to SID altitude restrictions when cleared to a final level above that depicted in the SID.
- Crews should not have to have to 'hunt' around for the cleared altitude. It should be in large font in a standard place on the chart.
- Descending according chart despite no clearance to descend during STAR
- Different accents, too fast communications, erroneous read back.
- Final altitudes need to have a standardized presentation on charts including bold lettering, and having a top altitude which is below a charted at or above altitude is asking for trouble.
- First a cleared level is given in the clearance, followed by further altitude restriction. The logical order should be the opposite.
- If vectored off the SID or STAR and no altitude clearance is given with the vector, what is the altitude clearance limit and is this limit clear of all obstructions and other aircraft.
- It happens generally when an SID includes waypoints with altitude restrictions, but the final altitude of the SID is higher than these altitude constraints.
- Mainly on SIDS. When a revised altitude to "maintain" clearance by a controller overrides a published altitude.
- Need the standardization of climb and maintain or descend and maintain
- Need to clarify if the altitude constraint needs to be maintained
- Often ATC omits to say "unrestricted" in the clearance

- Often the need to adhere to intermediate altitudes is not made clear.
- On many RNAV SIDs and STARs there are multiple altitude restrictions. On aircraft with VNAV this is not such a big deal but some aircraft do not have VNAV and this creates an exponentially higher workload for the pilots
- Problems related to maintain or not an altitude constraint specified on SID/STAR
- SID in airports where we found waypoints with at or above xxx ft....
- Sometimes there are misunderstandings with respect to ALT/FL
- Sometimes we don't receive any information for the descend profile when the ATC clears a STAR. Sometimes the ATC gives obvious descend instructions with the STAR clearance, another time the controller thinks that the crew will manage the flight profile without any instructions.
- Sometimes when the cleared level is below other crossing restrictions, when a "climb via SID" clearance is given with an altitude to maintain, there has been confusion on when to initiate a climb to higher altitudes.
- Specially when there is altitude restrictions. sometimes we are cleared to an altitude without saying nothing about complying or not with altitude restrictions, needed to ask for clarification
- STAR: When cleared for a STAR, some ATC Controllers still continues to clear you down on altitudes despite the fact, according to my knowledge, that when cleared a STAR, the clearance is both for lateral as well as for horizontal navigation!!! They seem to think that the STAR is only horizontal!"
- STAR: with altitude profiles. When is it allowed to descend. (misinterpretations / misunderstandings)
- The main problem is that sometimes an Air Traffic Controller instructs you to climb or descend via, and when you change the sector, the other controller request you to maintain a FL or altitude, so, in fact, via is not via....
- The "top" altitude clearance should be more visible and clear (maybe even renamed "top altitude") on the SID charts.
- The wording AT or BELOW "XXXX" Feet has to be caught by the flight deck crew all the time
- There should be a standard location for the altitude on ALL SIDs regardless if there is an associated altitude. Either put in an altitude or put "assigned by PDC" etc.
- Using 2 and 4 clear "for", clear "To"
- When cleared for a SID/ARR Plus radar altitudes
- When cleared to climb or descend to a level, above or below a restricted one.
- When climbing on SID or descending on RNAV arrival, some pilots when receive an altitude without the word via tends not to respect charts altitude restriction.
- When you have a level restriction in a SID and the control does not tell you "climb to fl...without restriction"

Regional distribution of the respondents' insight on any misunderstandings, misinterpretations or common errors made with the ATC phrase "Cleared Level or final altitude to be maintained" when issued for a SID or STAR?

Region	Yes	No	Provided Examples
Africa (AFI)	7	25	5
Asia Pacific (ASPAC)	65	140	54
Europe (EUR)	194	247	153
Commonwealth of Independence States (CIS)	3	2	3
North America (NAM)	95	102	84
North Asia (NASIA)	1	1	1
Latin America and the Caribbean (LATAM)	41	51	30
Middle East and North Africa (MENA)	44	30	37

Table 9: Regional distribution of the respondents' insight on any misunderstanding with the ATC phrase "cleared Level or final altitude to be maintained" when issued a SID or STAR?

Question 14 – 'With respect to question 13 and the potential confusion surrounding the "Cleared Level," how often do you find it necessary to clarify your assigned altitude/level with ATC while on a SID or STAR?': Of the 948 respondents, 34.1% (323) responses were uncertain of the meaning of the clearance and actually requested clarification from ATC at least once per 10 flights. 31.9% (302) responses indicated that they asked for clarification from ATC at least once per 100 flights. 20.4% (193) respondents indicated that they never requested clarification. However, 8.4% (80) respondents specified that they did request verification from ATC at least once per flight. 5.3% (50) respondents asked clarification all the time.

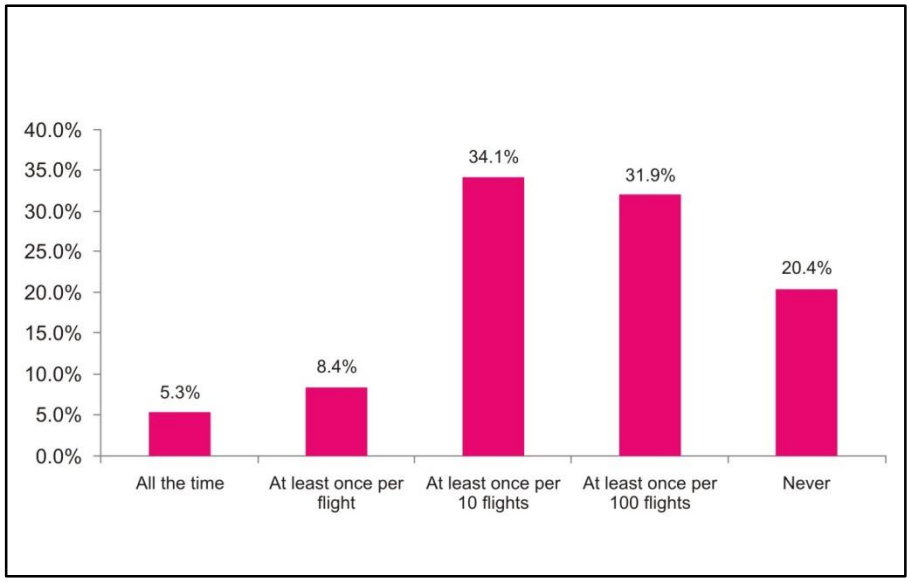


Figure 14: With respect to question 13 and the potential confusion surrounding the "Cleared Level," how often do you find it necessary to clarify your assigned altitude/level with ATC while on a SID or STAR

Regional distribution to this question is illustrated in table 10

Regions	All the time	At least once per flight	At least once per 10 flights	At least once per 100 flights	Never	Comments
Africa (AFI)	2	1	5	8	13	2
Asia Pacific (ASPAC)	4	16	60	54	52	14
Europe (EUR)	21	27	116	156	66	29
Commonwealth of Independence States (CIS)	0	0	2	2	1	0
North America (NAM)	10	11	80	49	39	14
North Asia (NASIA)	0	0	1	0	0	0
Latin America and the Caribbean (LATAM)	5	17	30	17	10	5
Middle East and North Africa (MENA)	8	7	29	15	11	11

Table 10: Regional Distribution of respondents' replies on any confusion surrounding the ATC phrase "Cleared Level" and how often they clarified with ATC the assigned altitude/level while on a SID or STAR

Furthermore, this question imposed an open field for the respondents to provide comments. A total of 75 remarks were provided. From the comments, it was obvious that flight crew asked for clarification from ATC in certain regions.

- "Climb unrestricted to xxx". Or say "climb to xxx via SID altitude restrictions".
- 10 and 100 flight too much apart; something in between
- All the time where this "except" wording is used.
- Certain airports are known for the practice so it is possible to brief the potential for a confusing clearance in advance, which reduces the chance of an error, if the crew is familiar with the airport.
- Cleared Level unrestricted or acc. (charts) restrictions?
- Depending on the FIR
- Depends on airport
- Depends on how clearly the altitude is depicted on the SID.
- Depends on the ATC facility. it appears the larger hubs are having to amend the charted altitude more often than not
- Different bottom altitudes for different runway assignments with no runway given. Specifically IAH.
- Depends upon star notes or profile...

- Ex Russian and Russian still use meters and confuse between QNH and QFE
- Especially in China, ATC doesn't respond to crew's conformation of cleared level or altitude.
- Different bottom altitudes for different runway assignments with no runway given.
- Very often lately there is low attention in the radio replay
- If the climb above a SID constraint is unrestricted.
- It shouldn't be so confusing. ATC phraseology should be so clear as to never be misunderstood
- Most clarification requests are related to whether the climb or descend clearance is unrestricted.
- Must verify with departure on initial contact to mitigate the chance for errors!
- Need to know whether the cleared level is unrestricted or need to follow the SID requirements
- On SID with no Initial minimum or max altitude or FL
- Pronunciation of French, Italian, Spanish ATC is bad.
- Sometimes a voice clearance is issued to an altitude above the one depicted on the SID and ATC expects you to still maintain the altitudes depicted on the SID, especially in Pakistan
- Sometimes the unrestricted is omitted by the controller where an altitude constraint exists
- This problem is mostly evident when operating outside of South Africa to the neighbouring countries.
- To before a flight level in a clearance should be pronounced non-standard. I.e. 'climb FL XX' should be made the standard format.
- To clarify (ask again for clearance) not just readback
- Usually just to clarify a clipped transmission or problems with accent.
- Usually relating to bring asked to track more direct and then rejoin the STAR
- Usually they clear a higher altitude than a hard restriction on the SID without using the correct phraseology.
- Usually, when I am tired or there is a lot of communications on the given freq.
- When controllers don't use standard phraseology.
- When taken off a star onto vectors. I need to confirm radar terrain clearance, as no longer descending via the star alt's.
- When usage of the word unrestricted is not used by ATC
- Without having an assigned altitude on the PDC (just a "climb via") although I think the altitude should still be on the PDC (to help reduce the chance for errors). I think one
- Worse at some stations… USA, South America??

Question 15 – 'If you answered yes to question number 14, please identify the region where misunderstandings / misinterpretations or common errors related to "Cleared Levels" on a SID/STAR were made.': Of the 718 respondents, the most identified region where misunderstandings /

misinterpretations or common errors related to "Cleared Levels" on a SID/STAR were made was in Europe (EUR) with 31.6% (227) responses, followed by NAM with 22.1% (159) responses, and then ASPAC with 17.4% (125) responses.

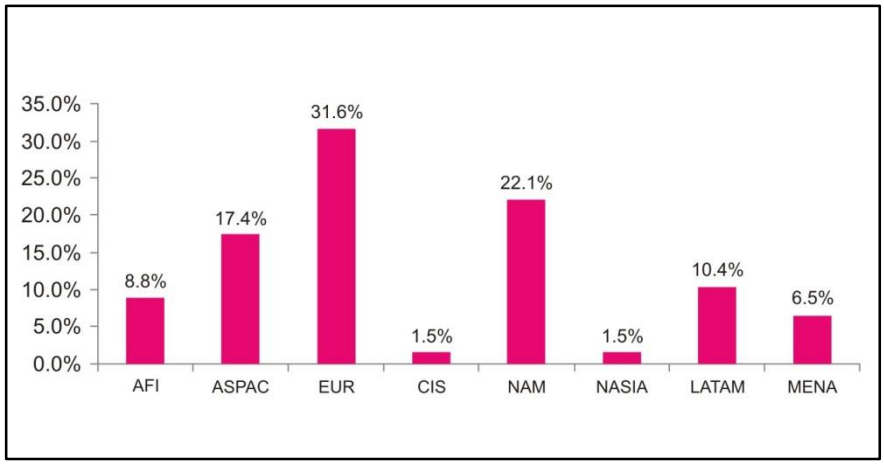


Figure 15: If you answered yes to question number 14, please identify the region where misunderstandings / misinterpretations or common errors related to "Cleared Levels" on a SID/STAR were made.

Question 16 – 'Are you aware of any other misunderstandings, misinterpretations or common errors made when accepting or executing a SID/STAR clearance after takeoff and/or before landing, as applicable?': Of 1,042 respondents, the majority of respondents with 75.9% (791) responses did not encounter any misunderstandings, misinterpretations or common errors made when accepting or executing a SID/STAR clearance after takeoff and/or before landing; while 24.1% (251) respondents specified that they ran into some misinterpretations.

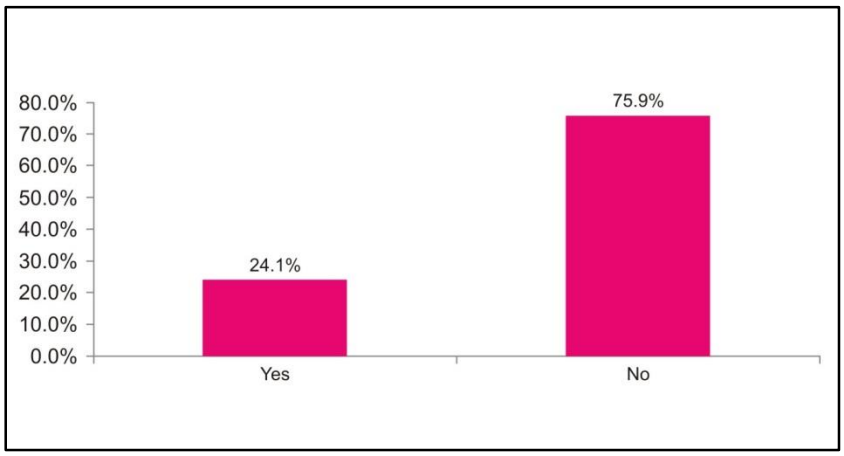


Figure 16: Are you aware of any other misunderstandings, misinterpretations or common errors made when accepting or executing a SID/STAR clearance after takeoff and/or before landing, as applicable?

Regional distribution of respondents to this question is illustrated in table 11.

Regions	Yes	No	Comments
Africa (AFI)	1	31	1
Asia Pacific (ASPAC)	38	167	32
Europe (EUR)	104	332	74
Commonwealth of Independence States (CIS)	1	4	2
North America (NAM)	63	132	58
North Asia (NASIA)	0	2	0
Latin America and the Caribbean (LATAM)	22	71	14
Middle East and North Africa (MENA)	22	49	19

Table 11: Regional Distribution of respondents' replies to this question

200 respondents provided input to this question; examples were extracted directly from the survey.

12 comments related to FMC/FMGC:

- Correct SID/STAR not updated in FMC.
- Either issue the SID/STAR as published or issue a different clearance. It is too difficult to modify preprogrammed SID/STARS in the FMC.
- FMGC Software deleting constraints under certain condition thus allowing the unaware crew to descend early due to a recomputed profile and the lowest altitude selected on the FCU.
- It is easy enough to change a SID/STAR in the FMGC but it takes considerable time to check/brief it properly. Late changes can easily lead to mistakes.
- Often, some of the restrictions shown on the Jepps page aren't pre-loaded in the stored FMS pages. I realize it's the pilot's job to verify all fixes in the FMS, but there's still the potential for oversight and/or data-entry errors when pilots have to alter the stored FMS procedures. The more conservative approach would be to have the FMS include ALL restrictions shown on the Jepps page, and then have the pilots delete ones that aren't necessary.
- Some of them have too similar names, so you read it back, but you do not recognize that a wrong procedure was prepared in the FMS.
- The FMS SID/STAR set up could cause unintentional deviation from the one assigned by ATC, because the crew might have not enough time/spare capacity to check/amend the data loaded.

36 comments related to language, pronunciation, phraseology, confusion misunderstanding:

- Because the language is not the language native.
- Pronunciation between 2, 3 and 6 or between 4 and 5 is extremely difficult for us to identify them.
- Climb to an altitude vs climb and maintain and whether the SID restrictions still affect the flight during the remainder of the climb.

- Climb Via" "Descend Via" phraseology is still not standardized.
- Confusion can arise where SID/STAR.
- Different phraseology between the regions/states upon resuming a STAR.
- Easy misinterpretation/confusion when descending VIA with amendments to lateral track.
- ATC often gives an "expect...STAR" and then never actually clear you for that STAR. It is as if the word "expect" is a clearance as far as they are concerned.
- I am aware of the case where the crew flew wrong SID because of confusion at the airport where you have many SIDs with similar.
- In a NDB Approach, many pilots misunderstand the Final Approach Fixed (FAF) with Missed Approach Point (MAPT).
- In some areas they frequently clear us to fly via a star when they mean the track only. Their phrasing needs to change if they do not want people to descend.
- In some cases, ATC will delete speed or altitude restrictions on a SID. Flight crews sometimes misunderstand what ATC meant when issuing the clearance to delete the restrictions.
- Language barriers.
- Misunderstanding regarding altitude restrictions related to the STAR.
- Normally confusions between designated SID's/STAR's names. Spelling/Interpretation errors.
- Often times ATC will take us off an arrival or clear us direct to a fix on the arrival and issue a descend via clearance. This can create confusion as to when to start the descent. I feel the controllers should be required to state the altitude they want us to maintain until we are on a published portion of the arrival and the point at which we should start the descent via the arrival.
- Point merge procedures need new standard phraseology, especially concerning information about track mileage.
- Poor radio communication, difficulty to understand due to local accent.
- Prior to the STAR we are assigned a speed to maintain. Later we are told to descend via the arrival (with no instruction to resume the published speeds). This is causing confusion as many people seem unclear as to whether the descend via clearance implies complying with the published speeds on the arrival, or whether we must receive specific clearance to resume the published speeds.
- SID states turn after a specific DME. Tower clears flight xyz, after departure turn heading 260, runway xx, cleared for takeoff. I then interpret the clearance to mean turn to heading after takeoff and not follow the DME turn per the SID only to find out that is not what the controller expected.
- Some controllers English is heavily accented.
- Sometimes the Captain does not understand when the altitude restrictions have been removed, or kept in place.
- Standard wording not used.
- The "Climb via" and normal "Climb and maintain" clearance still crates confusion. I think this will get better as crews get used to it.

- The instructions of "Climb Via except Maintain XXXX Feet" at the beginning seemed odd, but is making more sense now.
- The new radio call phrasing on "climb via SID" is awkward. Prior "Passing xx ft for xx ft" made sense. "Leaving xx ft, climbing via the XXX SID" makes it sound like you're just departing that altitude as opposed to "passing" thru it, and wouldn't ATC know your SID anyway? Confirming the "climbing to" altitude reinforced you were doing what was expected.
- This also applies when seeking to interpret go around. This is more dangerous as the opportunity to correct misunderstandings is significantly reduced.
- When exceptions are made by ATC, which seems to be the rule rather than the exception. Speeds and altitudes on SIDs and STARs are changed all the time by ATC and the exact phraseologies are too numerous and complicated to always clearly understand what is expected of us after a modification.
- When given a variance from the SID/STAR by a controller there is always confusion as to whether the remaining restrictions are still in effect. And, again, there is no standard phraseology among the controllers.
- When the ATC uses nonstandard phraseology.

48 comments related to ATC instruction, clearances:

- An 'expect (a certain STAR)' with no backup clearance given later for that STAR.
- Arrivals are changed from filed STAR almost 90% of the time. The nonce they are assigned to descend via...vectors and changes are still made. Stating the whole intent of the procedure. Changes are also given way to close to the next fix where a different descent path or lateral path is required leaving too little time to execute and confirm the change.
- Assigned a RTA by one controller, then queried about airspeed by next controller.
- Assigned speeds on the SID/STAR vs ATC assigned speeds.
- At times, controllers will not state "climb (or descend...) via XXX SID/STAR." Well designed SIDs/STARs can provide realistic altitude sequencing, especially if local controllers use the same altitudes or FLs at waypoints. This decreases the number of communications/verifications necessary. Occurs most frequently in China, where a well designed SID/STAR could eliminate nearly 40% of all radio calls on the frequency.
- ATC must be very clear when instructing aircraft to climb or descend to above or below levels specified on the chart.
- ATC not following standard departure procedures.
- Because there are SIDs with specific descend to altitudes and after we are cleared to perform the procedure the controller assign us a different altitude constraint.
- Busy us airport controllers always changing the plan
- "Clear to 2000ft instead of clear 2000ft"

- Cleared direct to a fix in combination with a descend via is generally accepted but not technically correct. Also, speed assignments are generally not cancelled by the final controller. This is generally remedied by the pilot slowing when he deems it appropriate.
- Cleared direct to a waypoint part of STAR and receiving no further clearance
- Climb via clearances or descend via when taken off the STAR; sometimes the controller does not give an altitude to maintain after taking an aircraft off the procedure.
- Common errors would be climbing/descending to a cleared level after departure without complying with SID/STAR published constraints since ATC has assigned the new level without bearing in mind that the word "unrestricted" was omitted.
- Controllers could provide more information about sequence for app, and provide a speed control instead of holding
- Controllers not advising if climb is unrestricted when giving further climb clearance.
- Controllers not saying "Unrestricted Climb" when there are "At Or Below" fixes coming up. Not sure if you have to comply of they simply say "Climb and Maintain FLXX0".
- Controllers use extended name of VOR and WYP, like we known as well as they, instead to spell
- Does the clearance for a STAR include a descent clearance?
- Last minute changes
- Late clearance for STAR (seconds before start and often only after inquiry)
- Too many details of following route given. Clearance should be limited to one point and the flight planned route. Additionally some controllers think we can write down the clearance at the high speed they are talking.
- Not always clear when the intermediate altitudes can be disregarded.
- Quite common to get a standard ATC clearance from a departure or arrivals controller that just gives a climb or descend instruction but does not specify if this requires compliance with the SID or STAR altitude requirements.
- Runway assignment changes on STARs are often very difficult to manage when provided later on arrival.
- Some pilots have not clear whether the STAR is cancelled when cleared from a point of a STAR to another point belonging to the same STAR.
- Speeds changes issued by ATC that conflict with published speeds on STARS.
- Step climb clearance to certain initial climb alt and just after takeoff cleared to a higher level without mentioning unrestricted due to SID constraints
- The biggest problem is when you are cleared for SID and it is immediately cancelled after takeoff.
- The Transition clearance is issued far too late, usually.
- When speed and/or altitude changes are made - it is difficult to know what to do when rejoining the SID/STAR

- When executing a SID as cleared but then being given modified instructions in the air. We should either use the SID/STAR as published or not at all.
- Wrong instructions or clearances. Instructions to making turn to the wrong side, to descent to wrong altitude, be cleared to start procedure when another aircraft still even saw the runway track, may cause a conflict if the aircraft go around.

27 comments related to speed/attitude restriction:

- Applicability of speed restrictions is often unclear
- Center gives a speed restriction of 250 kts. Approach gives us, "Descend Via" STAR. The first fix on the STAR includes Maintain 280 kts. I understand we are to accelerate to cross the fix at 280 KTS. However in a congested airport we always confirm the higher speed with Approach. We do not want to close the gap with the aircraft in front of us without confirmation. I usually reply with "Roger, Cleared to descend VIA 'the STAR's Name', understood current Speed Restriction Canceled at 'The Fix's Name'."
- Especially SID/STAR with many speed/altitude constraints in combination with frequently ATC assigned speed restrictions/ altitude clearances
- Executing direct to point of a STAR with no altitude constraints to follow.
- If speed restrictions still apply on the approach if told by control to "maintain best speed"
- In some countries, they want you to respect the altitude restrictions on a STAR, even when ATC clears you all the way down to a specific altitude. It's confusing.
- Often on SIDS, there are altitude restrictions. ATC often give clearance to a higher level without specifying whether those mandatory altitudes are still applicable. Also on STARs, ATC often give direct routings bypassing certain waypoints with mandatory crossing altitudes. Some ATCs expect pilots to cross abeam the mandatory waypoint at the specified altitude without actually instructing the pilots that the mandatory altitude still applies at the abeam waypoint position.
- Regional differences in altitude clearances deviating from restrictions on the SID/STAR. e.g. if SID is cross (FIX) at (XXX) ft and controller clears to higher level prior to this fix - restriction still applicable or not?
- Requests to maintain a speed that is not in agreement with a SID/STAR, or where there is no restriction on the SID/STAR, and you are not told when that speed restriction ends. This has led to many rushed approaches as the speed restriction is never removed, and we were not able to request a slower speed due to radio congestion.
- SIDs with "minimum altitudes" or STARS with "maximum altitudes" where these published altitudes are almost always cancelled by ATC. This may lead to the wrong impression that they don't even have to be considered. A better way would be to publish the restrictions ATC needs most of the time instead of publishing the most rigorous restriction ATC needs perhaps just 5% of the time. If you are allowed to disregard a certain limit "all the time" the awareness of this limit gets lower every time you are allowed to disobey the rule.
- Speed limitation when you are cleared for the IF instead of flying the whole STAR

- Speed restrictions /changes of SID or STAR at last minute
- Speed restrictions, when a clearance is received, climb xxx unrestricted, often the speed is not included
- The cleared alt with no restriction on a SID by ATC, sometime it's NOT so clear.
- There are some altitude constraints on STARs which are not followed (especially by "locals") when cleared for STAR and descend to final approach altitude.
- Unrestricted' climb, or descent (when there is no need to comply with all the constrains) is unknown in some places. Or they just don't know the terminology.
- When cleared direct to a point that bypasses others with altitude/speed restrictions, do either restriction still apply?
- When cleared direct to a waypoint within the SID we don't receive any confirmation if we still have to comply with the altitude /speed restrictions abeam the SID waypoints.
- When cleared direct to point further downline and/or given speed or alt constraints - not always sure if that means disregard SID/STAR or make constraints as published.
- When shortcutted is never clarified if you must comply with vertical restrictions abeam the point you are not flying over
- When STAR also contains TANSITION with speed and altitude restriction, but ATS instruction contradicts these restrictions without any comments
- When you are cleared via the arrival, you are expected to maintain the arrival and its constraints. In some countries, at major airports, some of the SIDs and STARs are poorly designed and some of the constraints are almost impossible to maintain due to aircraft performance causing unnecessary go arounds and unnecessary questioning between pilots and controllers.
- Whenever ATC, in particular RADAR, assigns levels above the "final" SID level, it may be unclear to what extent SID restrictions will still need to be observed. In many areas, a RADAR level clearance implies an "unrestricted" climb, while at some other locations ATC assumes compliance with the restrictions
- Whether any speed or altitude constraints still have to be followed when under radar and ATC provides short cuts within same SID/STAR

13 comments related to vectoring:

- Cleared to "Descend via XXX" then being vectored or assigned a heading or speed change while on the arrival or departure.
- If vectored off the SID/STAR, and then back on, it's not always clear what speed/altitude to maintain/re-intercept the procedure.
- Most problems are after being vectored off the procedure then returning to it.
- rejoining SID/STAR after vectors

7 comments related to vectoring:

- ATIS should advise whether they are operating with RNAV off the runway or Headings off the runway. This way I can program and brief the takeoff most appropriately.
- Mostly the same routing with different names, points coding and published altitudes for RNAV and non-RNAV procedure.
- The method used to issue clearances that involve RNP AR SIDs at Class D aerodromes is confusing. It attempts to marry ground based Nav aid clearances with RNAV clearances and results in a combination or requirements that are technically impossible to simultaneously comply with.

Question 17 – 'Is there one particular procedure, phraseology string or a common practice used by pilots or ATC related to SID/STAR that creates the greatest potential for misunderstanding or errors?': Upon analysis of the replies it has become clear that the potential for misunderstanding exists due largely to inconsistent implementation across all Regions. Of 1,027 respondents, the majority of respondents with 67.9% (697) responses replied negatively to this question, however, 32.1% (330) responses replied affirmative.

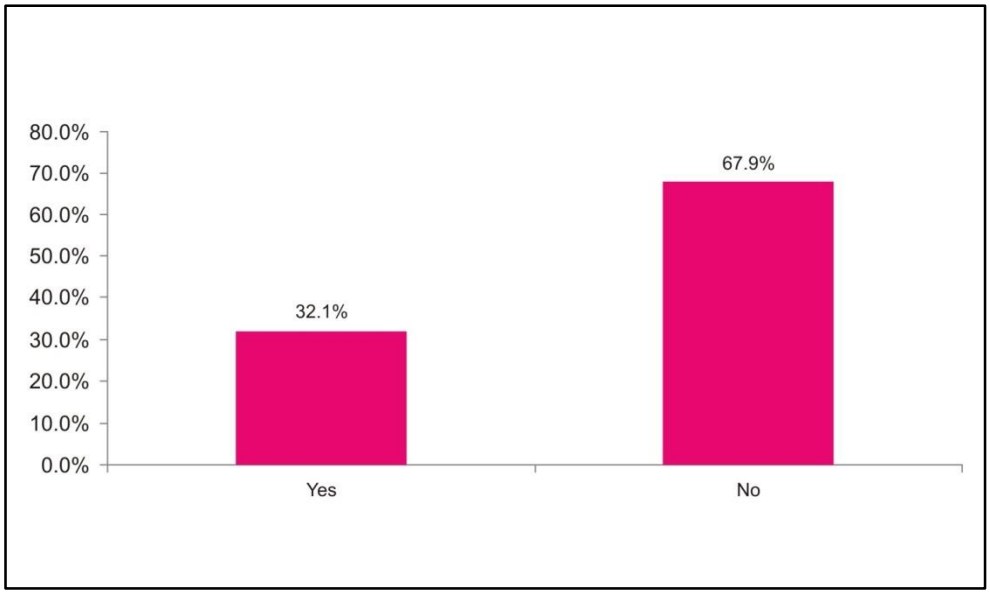


Figure 17: Is there one particular procedure, phraseology string or a common practice used by pilots or ATC related to SID/STAR that creates the greatest potential for misunderstanding or errors?

A list of regional breakdowns of responses for the respondents is shown in table 12.

	Yes	No	Comments
Africa (AFI)	4	30	3
Asia Pacific (ASPAC)	65	135	66
Europe (EUR)	105	330	99
Commonwealth of Independence States (CIS)	1	3	1
North America (NAM)	96	93	98
North Asia (NASIA)	0	1	0
Latin America and the Caribbean (LATAM)	30	60	27
Middle East and North Africa (MENA)	28	43	27

Table 12: Regional breakdown of responses

322 respondents provided input to this question; examples were extracted directly from the survey.

- "Climb Via except Maintain XXXX Feet"
- "Climb" clearances on a SID with altitude constraints. In some countries this means "climb unrestricted" other countries expect you to comply with charted altitude constraints
- "Climb/descend via" phraseology.
- "Except" The term "except is not used in a standard manner universally.
- "Warning step climb", in a clearance, all though everything is perfectly fine identified and specified in the charts, and may lead to confusion to pilots but also to different ATC controllers.
- A common practice done by ATC is to clear you via the arrival to intercept the final approach but that almost never happens at major airports. Usually ATC takes you out of the arrival by assigning you radar vectors without assigning an altitude to maintain, and so more unnecessary questioning is required.
- Active runway line up clearance
- Departure clearance is issued without initial climb altitude. Crew are expected to follow SID constraints, which sometimes, leads to errors or misinterpretations
- After takeoff on SID with one or more altitude restrictions, ATC clears to higher altitude, but does not specify whether the restrictions still apply.
- ALT Clearance : descent TO 2000 ft vs desc 2000ft
- At some destinations, the clearance for a STAR would be STAR name, followed by runway for landing followed by transition. In other destinations the sequence, it is STAR name, transition and runway.
- At or above/below limits on SIDS. And ATC clears you to higher alt s. Some areas expect u to adhere to SID reqs. Others expect u to climb direct.
- ATC not listening to and correcting read back or initial check-on altitude climbing to/descending to information.

- ATC not using proper phraseology
- Attempting to explain that your aircraft is capable of doing a procedure, but that you are not authorized to execute it.
- Being taken on and off STARs and consequently switching between radar terrain and STAR terrain clearance, can introduce confusion, especially when 'radar terrain' isn't specified in descent clearances when taken off a STAR. Additionally, compliance with STAR speeds is often not required/over-ridden, almost habitually. If pilots are cleared via a STAR yet never fly the STAR as designed and promulgated, it could introduce additional risk of confusion.
- Changing an SID or STAR on short notice or while already having been cleared for another one.
- Cleared "via" contains the altitude constraints given in the procedure. unclear when a controller instructs to omit this constraints
- Cleared decent on a STAR, clear to 11000ft does this mean via star profile or radar terrain. seems to change with each controller
- Climb and descent altitude changes when on a SID/STAR.
- Climb and maintain vs SID/STAR speed restrictions
- Climb Via, Descend Via, but it's getting better.
- Confusion in pronunciation between TWO and THREE
- Delete speeds phraseology
- If the controller does not listen for the correct read-back! ...AND later complains that you are flying the "wrong" SID, though you are flying the one you read-back!
- Issuing a final cleared flight level, however the SID having a lower hold down altitude. Often this hold down will vary because of whether you are flying Oceanic transition or not, off the same departure.
- Lack of readback and correct phraseology.
- mixing languages on the radio
- Poor English by controllers make it very difficult to understand.
- Runway change. Where the FMS has to be extensively reprogrammed
- Some APP ATCOs misunderstand the difference between Visual Approach and Contact Approach
- The Canadian and Americans have different operational methods for descending via a STAR. Lack of consistency drives operational errors.
- The use of "cleared to + number 2..." or "cleared + number 2..." without the words "level" or "flight level" in between
- The use of the term "open climb".
- The word "except" when used by ATC.

- When ATC changes a runway assignment for takeoff or landing after the crew has programmed and briefed a SID or STAR.
- when cleared for a STAR without altitude instructions
- When controllers in certain TMA's give the routing they expect you to follow airway by airway (when it is identical to the flight plan) followed by any speed restrictions, altitude clearances and then the STAR it can be too much information in one transmission. This leads to the possibility of errors through misunderstanding.
- When given a "Climb and Maintain" altitude clearance it often is queried by the pilot whether they still have to comply with specific waypoint altitudes on the SID/STAR.

Question 18 – 'With respect to questions 16 and 17, in what region do you most often experience misunderstandings, misinterpretations or make errors related to the acceptance or execution of a SID/STAR clearance?': The aim of this question was to gain some insight on the regions where they encountered the most misunderstanding related to acceptance or execution of a SID/STAR clearance, 647 responded to this question. The highest percentages were found in EUR and NAM regions, at 27.8% (180) responses.

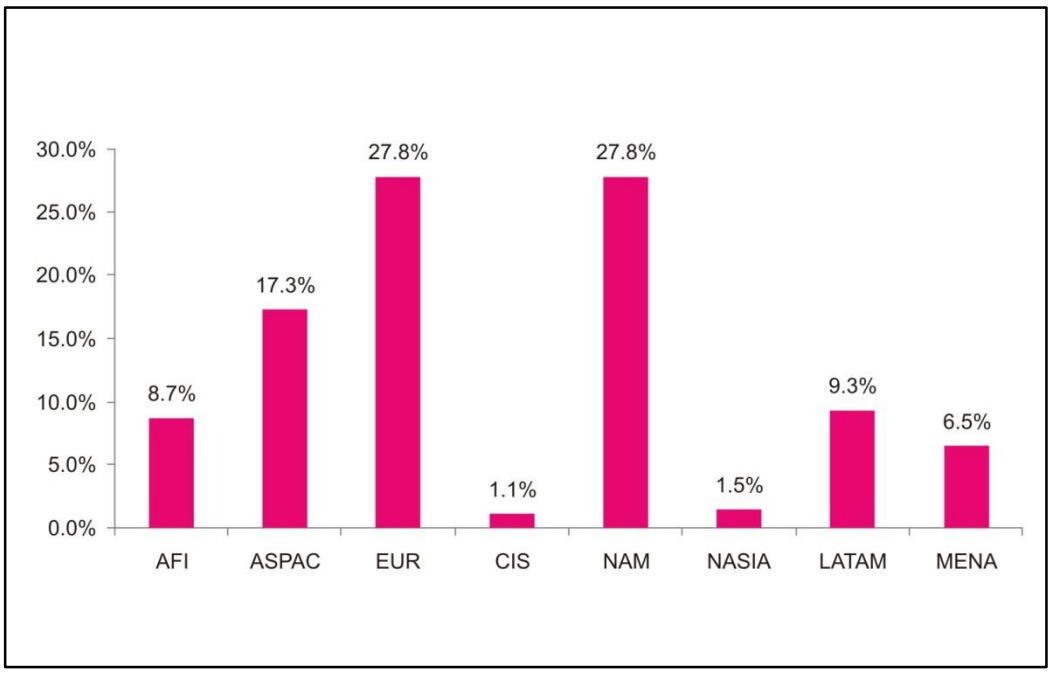


Figure 18: With respect to questions 16 and 17, in what region do you most often experience misunderstandings, misinterpretations or make errors related to the acceptance or execution of a SID/STAR clearance?

Question 19 – 'With respect to the applicability of route, level and speed restrictions on a SID/STAR, I have heard the following phrases used by ATC.': The aim of this question was to identify the phraseology used by ATC for altitude instruction and cancelling altitude restrictions. Of 956 respondents, the

majority of respondents with 81.6% (780) heard the phrase “Cleared via SID/STAR”; 50.2% (480) heard ATC using the phrase “Climb/Descend via SID/STAR”; 22% (210) respondents heard ATC using the phrase Climb/Descend on SID/STAR, and 4.1% (39) respondents heard the phrase Honor Altitudes on SID/STAR.

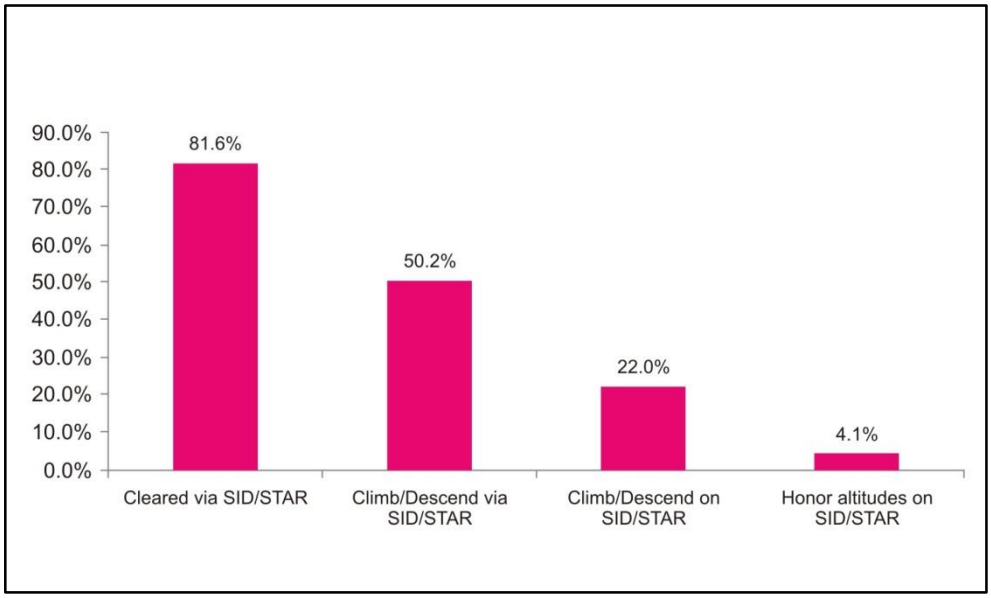


Figure 19: With respect to the applicability of route, level and speed restrictions on a SID/STAR, I have heard the following phrases used by ATC

Regional distribution of respondents to this question is illustrated in table 13.

Region	Cleared via SID/STAR	Climb/Descend via SID/STAR	Climb/Descend on SID/STAR	Honor altitudes on SID/STAR	Comments
AFI	22	4	2	0	6
ASPAC	153	120	60	4	25
EUR	338	96	70	6	51
CIS	4	2	0	0	0
NAM	143	184	50	18	10
NASIA	2	1	1	0	0
LATAM	61	50	10	3	3
MENA	56	20	16	6	8

Table 13: Regional distribution of respondent’s perception to phrases used by ATC

This question invited participants to include comments. A total of 103 respondents provided input. From the observations and remarks provided, it was apparent that there was a lack of standardization of ATC phraseology used in the world. The fact that many participants indicated that they have encountered an experience in a particular region should be considered in relation to their exposure and destinations. Some extracts are listed below.

MENA Respondents:

- Comply with star speed restrictions
- Cleared SID/STAR, without the word "via"
- Follow standard SID/STAR with profile
- Descent per procedure (mostly in India)

LATAM Respondents:

- When they say: climb via, but restrict at 10.000 ft. Climb via, or not? They create your own rules
- Cleared descent via until FLXXX (No alt restrictions until this FL)
- "Descend to XXF"L, then ask ATC for STAR confirmation.

NAM Respondents:

- Climb via the SID except maintain x000, comply with all altitude constraints
- Comply with the SID/STAR
- Do the best that you can via SID/STAR
- Comply with restrictions, except cross, except maintain speed until
- Comply with the speeds on...or disregard the speeds on the STAR, comply with the speed at...
- delete speeds until (fix)
- Climb via SID except maintain XXX

EUR Respondents:

- Proceed via SID/STAR, follow SID/STAR
- Climb unrestricted on SID
- Cleared via SID (initially) FL 090
- Descend according to STAR
- Proceed standard routing
- "Clear the xxxStar, descend to level yyy." When there are intermediate altitudes. When queried we advised to descend unrestricted.
- climb unrestricted, climb/descend now, descend on own descretion, when ready descent
- Climb/Descend XXX, follow SID/STAR
- Open climb, descent
- Speed restrictions in progress
- Descend according STAR-profile

- cleared SID/STAR, CLEARED TRANSITION AND PROFIILE
- warning step climb
- CLEAR ILS VIA STAR
- Keep constraints of SID,STAR
- Correct phraseology including altitude constraints are rarely used
- Cleared SID/STAR
- Cleared to SID/STAR follow vertical profile

ASPAC Respondents:

- cleared STAR profile to [altitude]
- "Descend via STAR profile", "maintain best speed", "keep your speed up"
- "Comply with altitudes restrictions" (mostly Asia)
- Descend STAR profile
- Via SID " PROFILE "
- Cleared to Descend to xxxx via STAR profile
- Descend via Star profile
- Cleared to descend via the STAR, comply with the speed and altitude restrictions
- Track via the sid, radar terrain
- Descend xxxx' in accordance with the STAR procedures
- Altitude constraints are generally specified in the clearance even though they are published on the SID/STAR
- Cancel SID, Altitude requirements still apply
- Open Climb/Descend via SID/STAR
- 'Unrestricted' is easily understood by controllers and other crews. We should use this phraseology

AFI Respondents:

- TO (AIRPORT) VIA SID
- "Continue as cleared"
- Cleared for the SID/STAR

Question 20 – 'With respect to the cancellation of level restrictions on a SID/STAR, I have heard the following phrases used by ATC.': Of the 997 respondents, 65.8% (656) heard the following phrase Climb/Descend Unrestricted, followed by 47.8% (477) respondents heard Climb/Descend and Maintain. 23.9% (238) respondents heard such phrase Cancel level Restrictions, followed by 23.3% (232) respondents heard the following: No level restriction, finally 11.7% (117) responses heard such a phrase Level Restriction Cancelled.

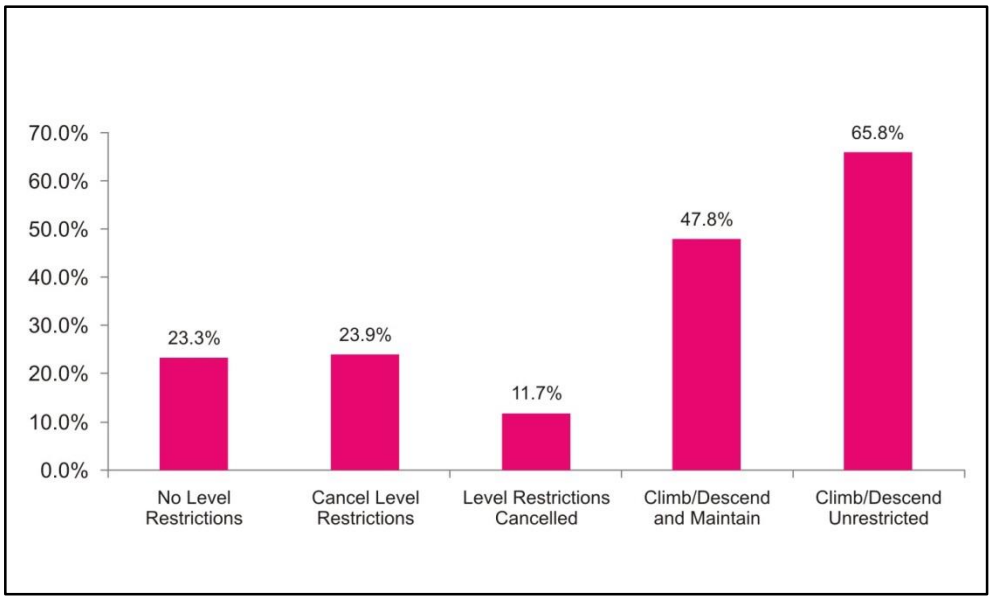


Figure 20: With respect to the cancellation of level restrictions on a SID/STAR, I have heard the following phrases used by ATC

However, a total of 124 provided comments. From the remarks provided, it was apparent that there was a lack of standardization of ATC phraseology used in the world. They also indicated that they did not hear ATC using such phrases as stated in Figure 20. Examples extracted directly from the survey are listed below:

MENA Respondents:

- Open climb or open descend
- Climb now
- I usually hear: "cancel SID/STAR and [instruction]"

NASIA Respondents:

- Climb now

LATAM Respondents:

- Cancel Restrictions

- Climb direct, disregard restrictions
- No altitude restriction
- Disregard altitude constraints

NAM Respondents:

- Restrictions Cancelled
- Delete the altitudes
- Descend via except.
- Delete the restriction
- Disregard the altitudes on the arrival (Canada)
- Cancel the speed and/or altitude restriction at
- Climb/descend via "except"...
- Except maintain
- Delete the speeds/altitudes
- Altitude restrictions cancelled
- I always have to ask if a climb is unrestricted, then I hear ATC use the term "climb/descend unrestricted".
- Delete restrictions
- Fly Heading 280 maintain 7000 (I guess this was his way of cancelling the descend via)
- Not cleared to LEVEL but saying cross Position at level 123

EUR Respondents:

- Clearance limit xxx feet or level
- Unrestricted descend-climb, descend according to STAR
- Open Climb, Climb Now, Descend Now
- ATC give other level/speed than the specified on SID/STAR and I comply
- No restrictions
- Climb/descend now
- No level constraint over
- Stop climb at level
- Cancel Constraint over(head)
- Cleared for any higher or lower altitude, then the next constraint, and expected to disregard the restriction (by default).

- Cancel the SID, Direct to xxx.
- "Open climb" is used as well to cancel at or below restrictions.
- No level/speed constraint
- Don't think I've heard the levels specifically canx, just a climb or descend to a new cleared level past the confines of the SID or STAR

ASPAC Respondents:

- cancel star height restrictions
- Cross wpt at and maintain
- Descend Radar Terrain to…(while on the STAR Tracks)
- Cancel altitude restrictions
- cancel step requirements on star
- Cancel speed and (or) height restrictions
- Radar descend to XX ALT
- Descend xxxx ft radar terrain
- No restrictions, without restrictions
- Descend via radar terrain clearance
- When the restriction are cancelled I usually get more direct tracking or tracking to a later point on the star and therefore bypassing all the restrictions.
- Cancel height restrictions on the star, descend xxxx
- Cancel Hold down
- Cancel Altitude Restrictions

AFI Respondents:

- re-cleared to flight level
- No speed

Question 21 – 'When requesting that level restrictions be cancelled on a SID/STAR, I have heard or used the following phrase.': Of the 734 respondents, 79.4% (583) responses heard or used such a phrase: "Request to Climb/Descend Unrestricted", followed by 19.1% (140) responses who have heard or used the following phrase "Request to Cancel Level Restrictions" followed by "Request No Level Restrictions" with 8.3% (61) and finally Request to Cancel Level Restrictions with 19.1% (140) respondents.

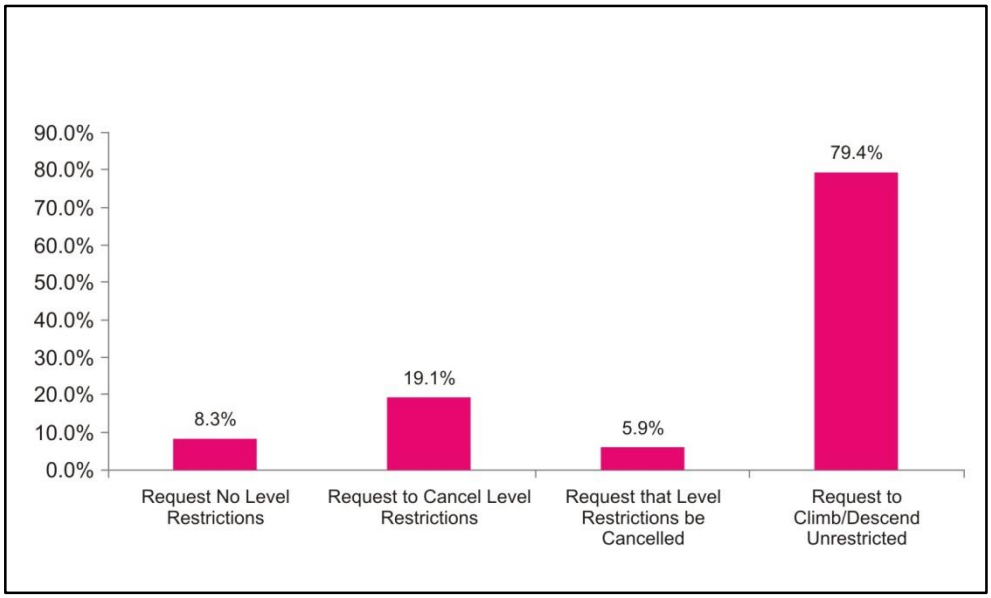


Figure 21: When requesting that level restrictions be cancelled on a SID/STAR, I have heard or used the following phrase

This question also invited participants to include their observations. A total of 122 respondents specified others and provided quotations of phrases they heard or used. From the observations, it was noted that some of the respondents indicated that they neither heard nor used phrases as stated in this question (reference to figure 21).

MENA Respondents:

- Confirm unrestricted
- Unable to comply with altitude restrictions due to ...request no level restrictions
- Confirm No Restrictions.
- Never requested
- Confirm any speed or altitude constraints?
- Please confirm if climb or descent clearance is unrestricted

LATAM Respondents:

- I never request cancellation of level restrictions, unless the controller gives us an instruction to do it.
- Confirm unrestricted
- Request fly direct to ... / Request to Climb/Descend without Restrictions
- without restrictions
- Confirm no altitude restrictions

NASIA Respondents:

- Is it open climb/descend

NAM Respondents:

- Delete altitude restrictions
- Comply with restrictions?
- Cancel altitude restrictions
- Climb to" altitude or "delete the restriction"
- Do you need the speed restrictions or Cancel speed restrictions
- Do you need the altitudes restrictions on the arrival?

EUR Respondents:

- Request to Climb/Descend Unrested VMC condition under pilot responsibility
- Request unrestricted descend/climb
- Pilots do not request cancellations. It is given by ATC
- I have never heard a pilot asking for level restrictions cancelation on SID/STAR. It should be an ATC matter
- Can we climb unrestricted
- Any altitude restriction?
- Confirm cleared altitude
- Confirm no altitude restrictions
- Request continuous climb
- Request open climb/descend
- Normally the pilot informs ATC with… Unable to reach altitude at...
- Confirm speed restriction in progress
- Open climb confirm?
- Is the restriction over (head) (still) valid?
- Request Non Step Climb
- Confirmation upon receipt of climb clearances higher than climb restrictions that these restrictions are lifted ("Confirm unrestricted climb")
- Pilots never ask it themselves. They just ask if there is any restriction.
- I personally never ask for level restrictions to be cancelled, this is ATC duty.

- Confirm altitude constraint valid
- Are altitude restrictions still applicable?
- Does the restriction at XXX still apply
- Only to fly dct away. Whenever ATC requires a SID/STAR I never ask for alt restrictions to be removed

ASPAC Respondents:

- Confirm STAR/SID Level restrictions cancelled
- request unrestricted climb/descent
- Any speed or level restrictions?
- Request further Climb/Descent
- Request higher hold down on the SID
- Can we waver the height restrictions?
- Request speed and (or) height requirements
- Request to cancel height requirements on the SID/STAR
- Request descent to xxxx' radar terrain (used in order to get visual sooner)
- Request climb FLXXX
- Request Radar Terrain
- Request Cancel Altitude Restriction
- Never really heard any of above BUT have always informed ATC if unable to meet the requirement of a SID by saying " unable to cross ---- at ----- ft
- Request to cancel altitude requirement
- Request cancel height requirements
- Confirm unrestricted? Confirm no altitude restriction?
- Request Open Climb/Descend

ASPAC Respondents:

- Confirm restrictions cancelled?
- Request further descend/climb.
- Request climb/descent climb

Table 14 illustrates a geographic distribution of the respondents to this question.

Region	Request No Level Restrictions	Request to Cancel Level Restrictions	Request that Level Restrictions be Cancelled	Request to Climb/Descend Unrestricted	Other
AFI	2	3	1	7	4
ASPAC	10	58	19	89	25
EUR	30	38	8	274	65
CIS	0	0	0	3	0
NAM	4	9	6	112	13
NASIA	0	0	0	1	1
LATAM	10	22	5	51	7
MENA	4	9	3	45	7

Table 14: Regional distribution of respondent's perception to phrases they use or hear when requesting that level restrictions be cancelled on a SID/STAR

Question 22 – 'With respect to question 20 and 21, I find one or more of the phrases used to cancel level restrictions difficult to understand or say (check all that apply).': The survey revealed that some phraseology used or heard were leading to misinterpretations and hence difficult to understand. The purpose of this question was to identify the phraseology used for cancelling level restriction. Of the 659 respondents, 46.7% (308) respondents indicated the following phrase was used: "No Level Restrictions", however "Cancel Level Restrictions" was used or heard as indicated by 40.7% (268) respondents, and the "Level Restrictions Cancelled" by 39.0% (257) respondents. Finally, 34.3% (226) indicated that they heard or used the following phrase: "Climb/Descend Unrestricted".

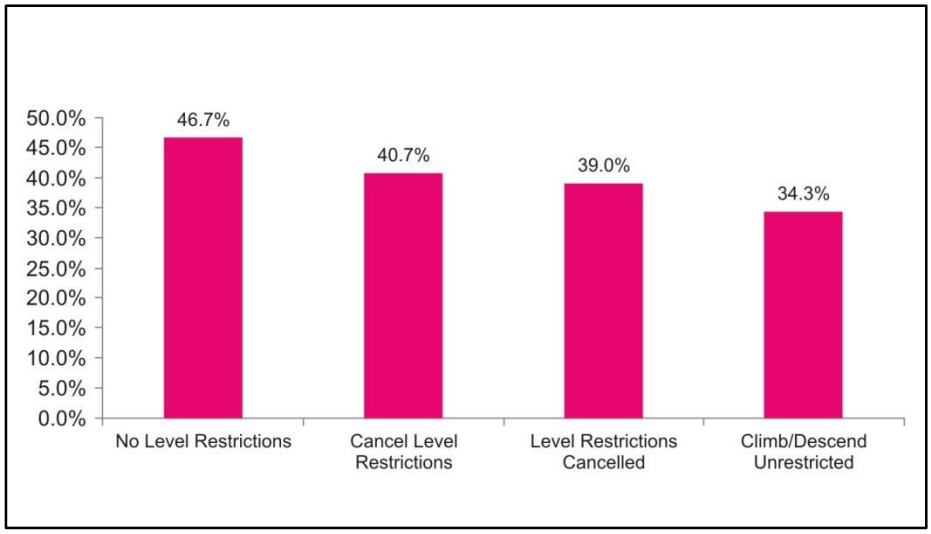


Figure 22: With respect to question 20 and 21, I find one or more of the phrases used to cancel level restrictions difficult to understand or say (check all that apply)

Furthermore, 41 respondents specified others and provided quotations of phrases they heard or used, some of the respondents indicated that all phrases heard were clear to them:

MENA Respondents:

- All easy to understand as long as they are verbalized and not rely on common practice. Some airfields will commonly cancel restrictions and eventually just expect everyone to know level restrictions don't apply.

LATAM Respondents:

- Climb unrestricted

NASIA Respondents:

- Climb now

EUR Respondents:

- Clearance limit canceled
- Climb/Descend and Maintain
- None of the above. am already happy if controller mentions if level restrictions are cancelled or not...
- Climb/Descend to an altitude but no mention of restrictions

ASPAC Respondents:

- "Descend via radar terrain" is used by ATC to cancel the level restrictions on a STAR. Locals may understand this but it as caused confusion with visitors.
- If any of the first three were used, I would wish to confirm that we were 'radar terrain' (if not visual) as these clearances aren't issued across the board here, would normally only relate to a specific waypoint.
- Cancel speed restrictions
- Cancel restrictions

AFI Respondents:

- Confirm no altitude restriction
- Nope - only cancel Seed restrictions at times!

Table 15 shows the distribution of all respondents to this question by region.

Region	No Level Restrictions	Cancel Level Restrictions	Level Restrictions Cancelled	Climb/Descend Unrestricted	Other
AFI	7	9	4	2	4
ASPAC	53	46	43	45	7
EUR	116	100	102	97	15
CIS	1	0	1	2	0
NAM	77	69	59	31	8
NASIA	0	0	0	1	1
LATAM	34	27	25	32	3
MENA	18	17	23	16	3

Table 15: Respondents' perceptions with respect to phrases used by ATC to cancel level restrictions difficult to understand

Question 23 – "With respect to questions 20, 21 and 22, I find the phrase "Climb/Descend Unrestricted": The purpose of this question was to gain insight on the global meaning of Climb/Descend Unrestricted. The survey revealed that of the 987 respondents, 47.7% (471) indicated that this phrase was less difficult to articulate or understand than other phrase they heard or used, while 37.2% (367) expressed that this phrase conveyed the same meaning and understanding like any other phrase that they heard or used, but only 15.1% (149) experienced difficulty in understanding than any other phrase they have heard or used.

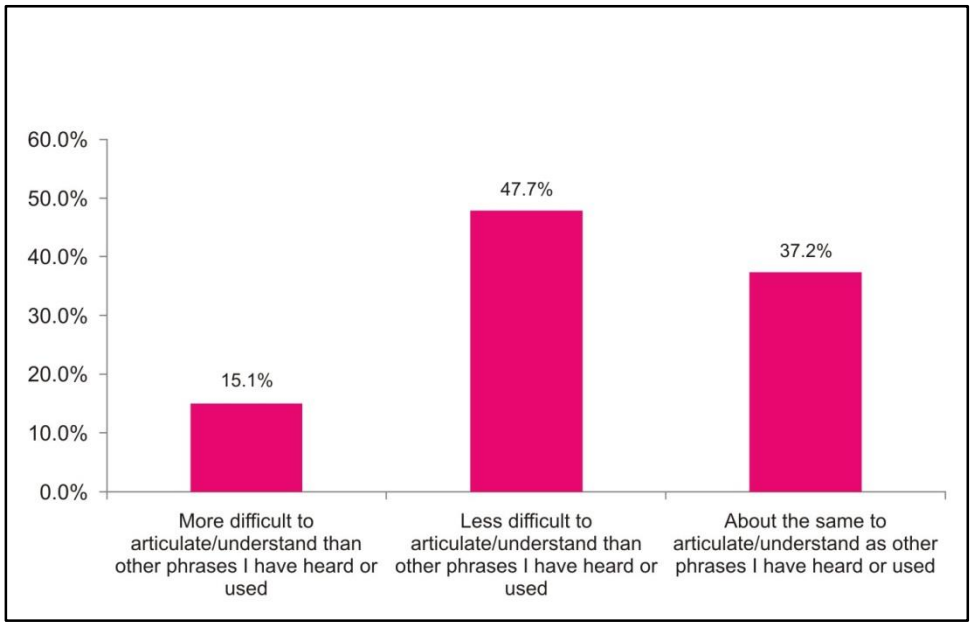


Figure 23: With respect to questions 20, 21 and 22, I find the phrase "Climb/Descend Unrestricted"

Table 16 shows the distribution of all respondents to this question by region.

Region	More difficult to articulate/understand than other phrases I have heard or used	Less difficult to articulate/understand than other phrases I have heard or used	About the same to articulate/understand as other phrases I have heard or used	Other
AFI	11	7	8	2
ASPAC	33	74	86	15
EUR	58	212	141	21
CIS	0	1	4	0
NAM	20	96	67	22
NASIA	0	0	2	0
LATAM	22	33	38	3
MENA	5	45	20	4

Table 16: The respondents' perception on the phrase "Climb/Descend Unrestricted"

Additionally, 67 participants provided a free text to this question, some of which were extracted and quoted below:

MENA Respondents:

- Easy to understand and straight forward
- The only complaint is that some controller and pilots use the local language during ATC Communications. That makes it difficult to know what is going on and having 3D's picture of the traffic around you.
- It is clear and concise.
- Climb/descend unrestricted for me only refers to altitude restrictions. Speed restrictions need to be kept.

LATAM Respondents:

- It's not difficult to say or articulate! None of them.
- It can be difficult to understand/articulate, so why not use a better phrase?
- Pronunciation can be hazardous!!!

NAM Respondents:

- Climb and Maintain (Unrestricted) and Climb Via (follow depicted altitudes)
- There is not sufficient, clear, understandable phraseology being used in the management of speed and altitude on SIDs and STARs. I find myself way too often wondering exactly what the controller's intent is and having to confer with the other crew member, or ask the controller what they want. This is

not a safe environment in which to be traveling in close proximity to other airplanes at a high rate of speed! It should be much clearer what the desires of the controllers are when they communicate to us regarding speed and altitude on the departures and arrivals!

- I have never heard, "Level Restrictions" on the radio. I would need to ask the controller what he was asking us to do.
- Also, some places overseas will clear you to an altitude on a SID but that doesn't remove intermediate altitude restrictions on the SID. As opposed to the US, where clearance to a higher altitude implicitly cancels any intermediate altitude restrictions on the SID. I wish that was consistent.
- Current use of climb and maintain or descend and maintain works fine for me
- For simplicity any time an amended clearance is received it should cancel a previous clearance. This is the case when assigned a SID but cleared to 'fly runway heading' on TO. It is sometimes not the case for levels when previously cleared to 'descend via'. If all amended clearances cancelled previous clearances compliance would improve. The restrictions can be re-issued if required.
- While we are at it, let's get rid of the hated "G/S inop" ILS clearance. It is dangerous. Part of it can be missed. It is a LOCALIZER approach.
- Some controllers have stated " climb/descend unrestricted until XXXXX. there is then confusion as to whether the published restriction begins at or after that waypoint.
- It's still going to be confusing if Altitude / Speed / Both restrictions are lifted?
- "Climb/Descend Unrestricted" is simple, clear, and easy to say.
- For me hearing "Climb Unrestricted" is the easiest phrase to comprehend and understand
- I like using and hearing the term "Climb/Descend Unrestricted"
- Delete altitude restrictions on XXXXX arrival might be better.
- It would clear all confusion if an ATC controller used the simple word "unrestricted" in their clearance. It alleviates all confusion.
- Please fix the read back confusion with altitude limits on both SIDs and STARs. It's a safety issue!
- It is a much clearer way to cancel the level restrictions. I like it!

EUR Respondents:

- The pre-syllable "un-" can easily be overheard
- It's more clear, by use the word: NO restriction iso unrestricted.
- Unrestricted could be related to speed, too. I prefer to have the level/altitude in the phraseology
- Restricted & unrestricted can be misinterpreted, what about FREE CLIMB?
- Unrestricted could mean ALT only, or ALT and SPD restrictions, or another combination. If more than one restriction is published there is always a need to clarify which restrictions are cancelled if ATC tells you only climb/descend unrestricted without specific info.
- Climb/descend flight level xxx unrestricted

- Unrestricted or restricted are confusing.
- Negative LVL restriction would also be nice
- I have no problem to articulated it. But there are some colleagues of mine who have.
- "CLIMB NOW" IS BEST
- “Climb/Descend Unrestricted:” THAT IS A GOOD ONE
- If the ATC uses the word 'Unrestricted' it is clear the meaning but they don't use it when needed.

ASPAC Respondents:

- "Unrestricted" is a good, concise and clear phrase
- In New Zealand the phrase 'Unrestricted' refers to speed only.
- Unrestricted for us will be descent to whatever we like. Therefore we can go to 1000ft for example if we want.
- Descend unrestricted makes sense, however climb unrestricted doesn't really make sense to me as your final cruise level will be a restriction for your climb. Here our re-clearances off a SID are clearly linked to our final cruise level, e.g. "Cancel Sid, climb FL220, direct....." This has the additional benefit of double checking the final cruise level, reducing risk of altitude excursions
- In regions with poorly VHF, it can be difficult to understand "unrestricted". And may be you can understand "climb restricted"
- While these SID/STARs are a good idea in concept, they just end up cluttering the frequency even more. Every pilot I fly with is going to read back something to the effect of "confirm unrestricted climb/descent" when issued a clearance that is different from one of these SID/STARs. It just doesn't work. It increases everyone's workload, both ATC and the cockpit. It's just a bad idea.
- It would be better to use OPEN CLIMB / OPEN DESCENT as now used in Turkey and India. This is easy to understand for pilots with limited English.
- "Unrestricted" is widely used in Asia by ATC, in China, Indonesia, Korea, Japan, India, Taiwan, etc. I have never seen any issues with this word, from ATC or pilots.
- If there is an altitude requirement, it should be specified which requirement is being cancelled, as some SID/STARs may have more than one requirement. This RTF is not a common to my Australian experience in aviation.
- It is unclear whether "unrestricted" should refer to speeds, rates of climb/descent, or particular level requirements on a SID/STAR

AFI Respondents:

- Never heard the phrase.

Conclusion

The conclusions in this section have been drawn from the analysis of responses and recommendations provided by the survey respondents in the survey questionnaire. The following factors, but not limited to, have been identified as contributory to misunderstanding:

- Phraseology used for SIDs/STARs clearances
- Non-Standard phraseology
- Rate of speech delivery and long string of instruction
- Difficulty for some non-native speakers in pronouncing English
- Ambiguity in general aviation language
- Lack of Harmonization
- Lack of Readback
- Use of native Language

The survey reveals the following:

- A total of 1,082 respondents replied to the SIDs/STARs phraseology study.
- The majority of the respondents were airline captains and first officers. The representation is quite adequate for the purpose of this study.
- 42% of the respondents were based or primarily conduct operations in Europe, followed by Asia Pacific and then North America with 19% each. It was notable that there was a reduced number of responses from participants in regions where English was not the principal language.
- The majority of respondents with 89% did not participate in the previous study (2011-Pilots/Air Traffic Controllers Phraseology Study) which was published by IATA in collaboration with IFALPA and IFATCA, making it difficult and meaningless to compare the survey responses from that study with those of this study.
- The majority of aircraft reported as operated by 90% respondents were Jet powered aircraft; and Jet pilots were statistically over-represented among respondents than turboprop pilots.
- The aircraft type flown by most of the respondents was equipped with FMC and Moving Map Display.
- Generation jet aircraft groups four (4) and three (3) were statistically over-represented among total respondents.
- 26% participants indicated that they used both Standard English and the language of the local country (other than English) to communicate. Mixed languages where international flight crew members speak English with Air Traffic Controllers and domestic flight crew members speak the country's language with controllers were one of the reported concerns.

- About 28% of the survey participants indicated a concern related to the way SIDs/STARs information was depicted on a chart, lack of clarity and formatting of SIDs and STARs on charts, lack of consistent depiction of speed and altitude restriction, same SIDs & STARs names for different runways
- 21% of the respondents claimed of some cases where PDC clearances led to misunderstanding between the Pilot and the ATC. Survey reported concerns associated with PDCs were: ambiguous clearances, lack of read back, pronunciation, PDC formatting, amended clearances vs. original filed clearances were easily misunderstood.
- 31% claimed of some cases where receiving a SID clearance over the radio led to misunderstanding between the pilot and ATC, mainly due to poor quality of radio transmission, pronunciation, lack of standard phraseology, proficiency of English language, ATC clearance instruction, etc…
- 43% of the respondents indicated a misunderstanding between pilots and controllers with respect to phraseology used by ATC clearance and instructions for SIDs and STARs.
- 34% participants claimed that the phrase "Cleared Level" led to confusion by the pilots and that they requested clarification from ATC at least once per 10 flights. 32% indicated that they asked for clarification from ATC at least once per 100 flights. 20% respondents indicated that they never requested clarification. However, 8% respondents specified that they did request verification from ATC at least once per flight. 5% asked clarification all the time. Most clarification requests were related to whether the climb or descend clearance was unrestricted.
- 24% respondents specified that they ran into some misinterpretations when accepting or executing a SID/STAR clearance after take-off and/or before landing, examples were provided such as the use of "cleared to + number 2..." without the words "level" or "flight level" in between; the word "except" when used by ATC.

Non-standard phraseology or the omission of key words may completely change the meaning of the intended message, resulting in miscommunication and potential traffic conflicts. For example, any message containing a number should include what the number refers to (e.g. a flight level, a heading or airspeed). Inclusion of key words helps prevent erroneous interpretation and allows for more effective read-back/hear-back. Furthermore, Pilots are urged when navigating on a published procedure (SIDs/STARs), to request clarification from ATC when there is any doubt whatsoever as to whether or not published level restrictions should be followed. It is very important to ensure that pilots have the proper altitude clearance and vertical profile expectations.

Pilots and Controllers might use non-standard phraseology with good intentions; however the use of standard ICAO phraseology helps to minimize the potential for misunderstanding.

This study aims to be a start in further opening lines of communication between Pilots and ATC, the States' regulators and the Airline management teams of IATA carriers. It is hoped that it will provide momentum towards a greater harmonization of communications, procedures and common practices around the world.

Appendix A—IATA Regions

Region	Country
AFI (Africa)	Angola
	Benin
	Botswana
	Burkina Faso
	Burundi
	Cameroon
	Cape Verde
	Central African Republic
	Chad
	Comoros
	Congo, Democratic Republic of
	Congo, Republic of
	Côte d'Ivoire
	Djibouti
	Equatorial Guinea
	Eritrea
	Ethiopia
	Gabon
	Gambia
	Ghana
	Guinea
	Guinea-Bissau
	Kenya
	Lesotho
	Liberia
	Madagascar
	Malawi
	Mali
	Mauritania
	Mauritius
	Mozambique
	Namibia
	Niger

Region	Country
	Nigeria
	Rwanda
	São Tomé and Príncipe
	Senegal
	Seychelles
	Sierra Leone
	Somalia
	South Africa
	Swaziland
	Tanzania
	Togo
	Uganda
	Zambia
	Zimbabwe
	Australia[1]
ASPAC (Asia / Pacific)	Bangladesh
	Bhutan
	Brunei Darussalam
	Burma
	Cambodia
	East Timor
	Fiji Islands
	India
	Indonesia
	Japan
	Kiribati
	Laos
	Malaysia
	Maldives
	Marshall Islands
	Micronesia
	Nauru

Region	Country
	Nepal
	New Zealand[2]
	Pakistan
	Palau
	Papua New Guinea
	Philippines
	Samoa
	Singapore
	Solomon Islands
	South Korea
	Sri Lanka
	Thailand
	Tonga
	Tuvalu, Ellice Islands
	Vanuatu
CIS (Commonwealth of Independent States)	Vietnam
	Armenia
	Azerbaijan
	Belarus
	Georgia
	Kazakhstan
	Kyrgyzstan
	Moldova
	Russia
	Tajikistan
	Turkmenistan
	Ukraine
EUR (Europe)	Uzbekistan
	Albania
	Andorra
	Austria
	Belgium
EUR (Europe)	Bosnia and Herzegovina
	Bulgaria
	Croatia
	Cyprus

Region	Country
	Czech Republic
	Denmark[3]
	Estonia
	Finland
	France[4]
	Germany
	Greece
	Hungary
	Iceland
	Ireland
	Israel
	Italy
	Kosovo
	Latvia
	Liechtenstein
	Lithuania
	Luxembourg
	Macedonia
	Malta
	Monaco
	Montenegro
	Netherlands[5]
	Norway
	Poland
	Portugal
	Romania
	San Marino
	Serbia
	Slovakia
	Slovenia
	Spain
	Sweden
	Switzerland
	Turkey
LATAM (Latin America & the Caribbean)	United Kingdom[6]
	Vatican City
	Antigua and Barbuda
	Argentina

Region	Country
	Aruba
	Bahamas
	Barbados
	Belize
	Bolivia
	Brazil
	Chile
	Colombia
LATAM (Latin America & the Caribbean)	Costa Rica
	Cuba
	Dominica
	Dominican Republic
	Ecuador
	El Salvador
	Grenada
	Guatemala
	Guyana
	Haiti
	Honduras
	Jamaica
	Mexico
	Nicaragua
	Panama
	Paraguay
	Peru
	Saint Kitts and Nevis
	Saint Lucia
	Saint Vincent and the Grenadines
	Suriname
	Trinidad and Tobago
	Uruguay
	Venezuela
MENA (Middle East & North Africa)	Afghanistan
	Algeria
	Bahrain
	Egypt
	Iran
	Iraq
	Jordan
	Kuwait
	Lebanon
	Libya
	Morocco
	Oman
	Qatar
	Saudi Arabia
	Sudan
	Syria
	Tunisia
	United Arab Emirates
	Yemen
NAM (North American)	Canada
	United States of America[7]
NASIA (North Asia)	China[8]
	Mongolia
	North Korea

[1]Australia includes:
Christmas Island
Cocos (Keeling) Islands
Norfolk Island
Ashmore and Cartier Islands
Coral Sea Islands
Heard Island and McDonald Islands
[2]New Zealand includes:
Cook Islands
Niue
Tokelau
[3]Denmark includes:
Faroe Islands
Greenland
[4]France includes:
French Polynesia
New Caledonia
Saint-Barthélemy
Saint Martin
Saint Pierre and Miquelon
Wallis and Futuna
French Southern and Antarctic Lands
[5]Netherlands include:
Netherlands Antilles
[6]United Kingdom includes:
England
Scotland
Wales
Northern Ireland
Akrotiri and Dhekelia
Anguilla
Bermuda
British Indian Ocean Territory
British Virgin Islands
Cayman Islands
Falkland Islands
Gibraltar
Montserrat
Pitcairn Islands
Saint Helena
South Georgia and the South Sandwich Islands
Turks and Caicos Islands
British Antarctic Territory
Guernsey
Isle of Man
Jersey
[7]United States of America include:
American Samoa
Guam
Northern Mariana Islands
Puerto Rico
United States Virgin Islands
[8]China includes:
Hong Kong
Macau
Taiwan

Appendix B—Pilots Survey Questionnaires

In 2011, the International Air Transport Association (IATA), together with the International Federation of Air Line Pilots' Associations (IFALPA) and the International Federation of Air Traffic Controllers' Associations (IFATCA), jointly prepared an on-line survey regarding communication issues that focused on the use of non-standard ICAO standard phraseology. The survey results were analyzed and subsequently published in the 2011 "Pilots/Air Traffic Controllers Phraseology Study." Numerous problem areas were identified and the study continues to provide the basis for joint efforts to "globalize" phraseology, which if left un-addressed, has the potential to undermine the safe conduct of routine flight operations as well as undermine the implementation of new ATM procedures.

Language and communication issues remain very important and the use of standardized phraseology is one of the most important elements in the process of communication. With this notion in mind it is extremely important that, as members in the global aviation community, we take advantage of every opportunity to harmonize phraseology.

As an extension of the 2011 Phraseology Survey, IATA and IFALPA are co-sponsoring a new and separate follow-up survey for airline Pilots in order to collect information specific to the issue of SID/STAR clearances. This follow-up survey is designed to identify areas where SID/STAR phraseology has been, or continues to have the potential, to be misunderstood.

The survey inputs will be compiled, analyzed, segregated by region and airport to provide feedback of what was found to the appropriate entities. The survey results will also be published to the industry and ATC organizations as an addendum to the 2011 Phraseology Study. This survey is totally anonymous and the region where you are based or type of flying that you do is only required for us to segregate the data properly.

1. I am an
    - Airline Captain
    - Airline First Officer
    - Other, please specify

    [ ]

2. I am based in this region:
    - Africa (AFI)
    - Asia Pacific (ASPAC)

- Europe (EUR)
- Commonwealth of Independence States (CIS)
- North America (NAM)
- North Asia (NASIA)
- Latin America and the Caribbean (LATAM)
- Middle East and North Africa (MENA)

3. I have participated in a previous phraseology study sponsored by IATA, IFALPA, and IFATCA.
   - Yes
   - No

4. What type of aircraft do you mainly fly?
   - Jet
   - Turboprop
   - Other, please specify

   [ ]

5. The aircraft I fly is equipped with a Flight Management Computer (FMC) and Moving Map Display.
   - Yes
   - No

6. My flying is mostly:
   - Domestic
   - International
   - Both

7. If I am based in a country where English is not the mother tongue, what language is used to communicate.
   - Standard English
   - Language of the country which is other than English
   - Both

8. This question refers specifically to concerns related to the way SID/STARs are depicted on procedural charts.
   - Yes
   - No
   - If yes, please provide specific details

9. Are you aware of misunderstandings, misinterpretations or common errors made when using Pre Departure Clearance (PDC) procedures to obtain SID/STAR clearances?
   - Yes
   - No
   - If yes, please provide specific details

10. If you answered yes to question number 9, please identify the region where misunderstandings / misinterpretations or common errors related to SID/STAR clearances obtained using PDC procedures were made.
    - Africa (AFI)
    - Asia Pacific (ASPAC)
    - Europe (EUR)
    - Commonwealth of Independence States (CIS)
    - North America (NAM)
    - North Asia (NASIA)
    - Latin America and the Caribbean (LATAM)
    - Middle East and North Africa (MENA)

11. Are you aware of misunderstandings, misinterpretations or common errors made when receiving a SID clearance over the radio (No PDC procedures available)?
    - Yes
    - No
    - If yes, please provide specific details

12. If you answered yes to question number 11, please identify the region where misunderstandings / misinterpretations or common errors related to SID clearances received over the radio prior to departure were made.
    - Africa (AFI)
    - Asia Pacific (ASPAC)
    - Europe (EUR)
    - Commonwealth of Independence States (CIS)
    - North America (NAM)
    - North Asia (NASIA)
    - Latin America and the Caribbean (LATAM)
    - Middle East and North Africa (MENA)

13. Are you aware of misunderstandings, misinterpretations or common errors made related to the "Cleared Level" or final altitude to be maintained when issued a SID or STAR?
    - Yes
    - No
    - If yes, please provide examples

14. With respect to question 13 and the potential confusion surrounding the "Cleared Level," how often do you find it necessary to clarify your assigned altitude/level with ATC while on a SID or STAR?
    - All the time
    - At least once per flight
    - At least once per 10 flights
    - At least once per 100 flights
    - Never
    - Comments (Optional)

15. If you answered yes to question number 14, please identify the region where misunderstandings / misinterpretations or common errors related to "Cleared Levels" on a SID/STAR were made.
    - Africa (AFI)
    - Asia Pacific (ASPAC)
    - Europe (EUR)
    - Commonwealth of Independence States (CIS)

- North America (NAM)
- North Asia (NASIA)
- Latin America and the Caribbean (LATAM)
- Middle East and North Africa (MENA)

16. Are you aware of any other misunderstandings, misinterpretations or common errors made when accepting or executing a SID/STAR clearance after takeoff and/or before landing, as applicable?
    - Yes
    - No
    - If yes, please provide specific details

17. Is there one particular procedure, phraseology string or a common practice used by pilots or ATC related to SID/STAR that creates the greatest potential for misunderstanding or errors?
    - Yes
    - No
    - If yes, please provide specific details

18. With respect to questions 16 and 17, in what region do you most often experience misunderstandings, misinterpretations or make errors related to the acceptance or execution of a SID/STAR clearance?
    - Africa (AFI)
    - Asia Pacific (ASPAC)
    - Europe (EUR)
    - Commonwealth of Independence States (CIS)
    - North America (NAM)
    - North Asia (NASIA)
    - Latin America and the Caribbean (LATAM)
    - Middle East and North Africa (MENA)

19. With respect to the applicability of route, level and speed restrictions on a SID/STAR, I have heard the following phrases used by ATC:
    - Cleared via SID/STAR
    - Climb/Descend via SID/STAR
    - Climb/Descend on SID/STAR

- Honor altitudes on SID/STAR
- Other, please specify (if applicable)

20. With respect to the cancellation of level restrictions on a SID/STAR, I have heard the following phrases used by ATC:
    - No Level Restrictions
    - Cancel Level Restrictions
    - Level Restrictions Cancelled
    - Climb/Descend and Maintain
    - Climb/Descend Unrestricted
    - Other, please specify (if applicable)

21. When requesting that level restrictions be cancelled on a SID/STAR, I have heard or used the following phrase:
    - Request No Level Restrictions
    - Request to Cancel Level Restrictions
    - Request that Level Restrictions be Cancelled
    - Request to Climb/Descend Unrestricted
    - Other, please specify (if applicable)

22. With respect to question 20 and 21, I find one or more of the phrases used to cancel level restrictions difficult to understand or say (check all that applies).
    - No Level Restrictions
    - Cancel Level Restrictions
    - Level Restrictions Cancelled
    - Climb/Descend Unrestricted
    - Other, please specify (if applicable)

23. With respect to questions 20, 21 and 22, I find the phrase “Climb/Descend Unrestricted”:

- More difficult to articulate/understand than other phrases I have heard or used
- Less difficult to articulate/understand than other phrases I have heard or used
- About the same to articulate/understand as other phrases I have heard or used

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