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Not Using Standard Phraseology: Misunderstandings and Delays

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Abstract: In order to ensure safety, international aviation radio communication is conducted in a restricted language, based on English but with significant constraints and specific characteristics. Deviations from standard phraseology are tolerated to a certain extent and are to be expected in non-routine situations where no exact phraseology has been defined. Some relational language is also accepted as helping smooth interactions. But any additional word increases the length of the speech signal and may make it more difficult for the recipient to identify the important words that need to be attended to, so the use of relational language can also have a detrimental effect. Clarity and lack of ambiguity are particularly necessary when the interlocutors do not share the same language background. This paper analyses the communications during an incident at Narita (Japan) where a native English-speaking pilot used unnecessary words that are not part of the expected phraseology to communicate an emergency, making it difficult for the Japanese ATC to extract the crucial words 'vector back to Narita' from the pilot's transmission. Supported by a close linguistic study of the complete interaction in this incident and by interviews with aviation experts, the analysis employs the Community of Practice framework to investigate the series of misunderstandings. It shows how non-standard phraseology and unnecessary verbosity can be detrimental to successful aviation communication, even if the additional words are intended to build rapport and help the interaction.

Keywords: Standard phraseology, non-standard phraseology, misunderstanding, non-routine situation, Community of Practice, verbosity, relational language, (un)ambiguity

Introduction

On 9 July 2021, a National Cargo Boeing 747-400 (B744), registration N756CA, conducting flight NCR891/N8891 from Tokyo Narita International Airport (Japan) to Seoul Incheon International Airport (South Korea) reported a fire indication in a cargo compartment during the climb out of Narita Airport, at about 27,000 feet. Fortunately, the incident ended with a successful return to Narita. Unfortunately, the communication between the pilots and air traffic controllers was so problematic that the recording of the incident was posted on YouTube (https://www.youtube.com/watch?v=UTDdc_CU6fk) and attracted many comments regarding the inadequacy of the pilots' phraseology as well as the strong accent of

one of the Japanese air traffic controllers. While the first air traffic controller's Japanese accent indeed made her difficult to understand for non-pilots or non-Japanese speakers, as evidenced by the comments posted below the YouTube video, almost all her transmissions were correctly understood by the pilots of Flight NCR891. On the other hand, the fluent US English pilots on Flight NCR891 were unable to convey efficiently the nature of their emergency to Tokyo Air Traffic Control (ATC), despite repeating their transmissions a number of times. While the incident itself highlights important issues in international aviation communication, the negative comments about both the Japanese ATC and the English-speaking pilots posted on YouTube also raised a number of questions regarding the perception of what is acceptable and what should be expected in the aviation context, and prompted the study presented here. Although these YouTube comments were not analysed in any detail, they were used as a resource complementing the interviews with aviation experts and the close linguistic analysis of the actual transmissions.

Aviation communication is standardised by the International Civil Aviation Organization (ICAO). In addition to prescribing aeronautical Standard Phraseology (SP), a set of words and phrases to be used in specific phases of flights, ICAO proposed Language Proficiency Requirements (LPRs) described in Doc 9835 (ICAO 2004, 2010) along with the Language Proficiency Scale. The implementation of the LPRs took effect from 2011, aiming at the assessment of language proficiency of pilots and air traffic controllers for international operations. The Language Proficiency Scale lists language items to be performed within 6 levels, Level 4 (also called Operational) being the minimum level for licensure. Divided into 6 language areas – pronunciation, structure, vocabulary, fluency, comprehension and interaction – the Scale provides parameters to aviation regulatory agencies of member countries (Contracting States). Doc 9835 also states that all participants in international radiotelephony (R/T) communications – specifically pilots and air traffic controllers – should be subject to the LPRs (E. Friginal/ E. Mathews/ J. Roberts 2019). Nevertheless, although Doc 9835 mentions that the LPRs are applicable to both native and non-native English speakers, the responsibility seems to have mainly fallen on the latter. Only recently have some inner-circle countries (B.B. Kachru 1985) imposed requirements on the assessment of English proficiency of native English speakers pilots and controllers (D. Estival 2019).

Annex I to the Convention on International Civil Aviation with recommended practices to Personnel Licensing set the tone for the non-imposition of the LPRs to English speaking countries: "[f]ormal evaluation is not required for applicants who demonstrate expert language proficiency, e.g. native and very proficient non-native speakers with a dialect or accent intelligible to the international aeronautical community" (ICAO 2011: 1.13).[1] This prerogative exercised by native English speakers (NES) or very proficient non-native English speakers (NNES) results in issues such as the one described by J. C. Alderson (2011: 396):

> In the United States in particular, it would appear that not only are those who apply for an English certificate somehow automatically granted one on payment of a trivial fee,

[1] ICAO does not define the term *native speaker,* but uses it rather conservatively in spite of their awareness of the complexity in multilingual settings (ICAO 2010). B. Clark (2017: 7) defines the term as: "A user of a language (e.g. English) who was raised learning and using that language as their primary language, generally having used the language to communicate from the time s/he was a child. 'Using' in this context includes not only speaking but also reading and writing the language". In this paper we also consider highly proficient non-native speakers as (near) native speakers following the convention used in the aviation industry.

> but also all those who were already operating as pilots or air traffic controllers under previous legislation are entitled to retain their license at Level 6 under what are known as grandfather rights…

Doc 9835 states that Expert Level 6 exceeds the realm of aeronautical radio communications, while advocating that the scope of the LPRs should be aeronautical radio communications – one of many contradictions found within the document. This reinforces the attitude where NNESs, treated as EFL/ESL learners, are imposed rules related not only to English proficiency but also to radio communications, including SP, whereas NESs (and highly proficient NNESs who have been assessed as near-native) are excused from any obligation in this regard. Additionally, with the emphasis placed on the LPRs or on Level 4, little research has been devoted to the training of SP. Although SP, thanks to its prescribed, precisely documented and scripted nature, is necessary for good flight operations (ICAO, 2010), it is not, according to Doc 9835, to be assessed through the LPRs, since it belongs to the operational area and not to language proficiency. It is generally assumed that, because the use of SP is mandatory in radio communications, all participants will employ it at least in routine phases of the flights.

One issue that has not been studied enough in previous literature is that of the responsibility of NESs when interacting with NNESs. Although the lack of adherence to SP, mainly by NESs, has been addressed, it is often assumed that the responsibility for communication problems, along with the burden of language licensing requirements, falls solely on NNESs. B. Clark (2017), in a report commissioned by the Civil Aviation Authority (CAA) of the United Kingdom, states that NESs contribute to miscommunications on the radio as result of "overuse or overreliance on plain language" (B. Clark 2017: 14). Her report gives examples of such plain language, including slang, varied vocabulary, and wordy transmissions compared to what is prescribed in SP. Other causes of miscommunication, many of them caused by native English speakers, include rate of speech (M. Bieswanger 2013, J. Trippe/ M. Baese-Berk 2019), impoliteness resulting from lack of intercultural awareness (M. Bieswanger 2013, A. Borowska 2017, 2020; N. Ishihara/ H. E. Lee 2021), imposition of power (A. Borowska 2020), lack of accommodation skills (H. Kim/ C. Elder 2009). Importantly, language expertise and professional knowledge are intertwined and thus should be integrated in the language assessment for aviation specialists (C. Elder/ T. McNamara/ H. Kim/ J. Pill/ T. Sato 2017).

The current study aims to identify the specific sources of the communication difficulties in this particular incident, in order to illuminate some more general problems in aviation R/T communication. To this end, we employ the Community of Practice (CoP) framework, described in the next section. Section 2 then describes our two-prong approach: a close linguistic analysis of the audio data and interviews with aviation experts. Section 3 presents the findings from the interviews, including confirmation of transcript corrections and interpretation, and section 4 the results of the data analysis.

1. Community of Practice

The Community of Practice (CoP) framework (J. Lave/ E. Wenger 1991) defines three conditions that must be met: mutual engagement, joint enterprise, and shared repertoire (E. Wenger 1988). Identifying the context of research according to these criteria allows for a comprehension of the tasks performed, their association with the interaction and the participants' relationship management (S. Ehrenreich 2017, B. Seidlhofer 2009). N. Ishihara/

M.C.D.A. Prado (2021), N. Ishihara/ H. E. Lee (2021) related radio communications between pilots and controllers with CoP, recognizing that "their mutual engagement in their respective roles constitutes a variety of professional practices, as in the genre of R/T communications, which take place through a prescribed repertoire of aviation phraseology" (N. Ishihara/ M.C.D.A. Prado 2021: 643).

H. Kim's (2018) study confirms that SP is of utmost importance and belongs to the realm of shared knowledge of the professionals. When pilots and air traffic controllers interact, they expect to do so in such a way that they can understand each other in order to fulfil the task at hand; this, however, does not mean that they live in an idealized world where conflicts do not happen (see S. Ehrenreich 2017). This is illustrated by a study of a 15-hour corpus of pilot-ATC communications in routine situations, compiled in the USA for an analysis of communication efficiency, which identified that pilots cause more misunderstanding than controllers, that there was excess of information in the turns, and that deviations from SP was one of the major causes of communication breakdowns (J.W. Howard 2003, 2008). D. Estival/ C. Farris/ B.R.C. Molesworth (2016) find that other factors which can compromise radio communication, such as a faulty radio, cognitive overload and fatigue, may be as important as lower language proficiency. A. Thorpe/ D. Estival/ B.R.C. Molesworth/ A. Eidels (2022) show that operational tasks are prioritized over communication, ensuring adherence to flight standards even when communication is compromised. The importance of technical expertise by all interactants for the production and understanding of radio communications is also pointed out by H. Kim (2018), who argues that communications are a shared responsibility.

However, even with a shared repertoire, strict adherence to SP may not be feasible due to social conventions and cultural expectations at play even in predictable routine situations (N. Ishihara/ M.C.D.A. Prado 2021, S. Lopez 2013, J. Mell 2004, A.L.T. Monteiro 2019). J. Mell (2004) and S. Lopez (2013) found that a large portion of routine R/T communication is language for managing the pilot-controller interaction or dialogue. Regarding non-routine or emergency situations, a conversation analysis of the communication of Flight 1549, the Airbus that ditched on the Hudson River in New York, USA in 2009, showed that, when dealing with a problem, pilots and controllers may switch to a more conversational type of language that contains elements such as deixis and pragmatic formulas, which signal a transition between standardized instructions and the discussion of the problem (A.C. Garcia 2016). This can be viewed as the joint enterprise of safe aeronautical operation overriding the limits of the shared repertoire. It exemplifies another feature of CoP, that of mutual engagement: all participants of a given community need to make sense of and participate in a common practice. H. Kim (2018) refers to distributed cognition studies to highlight the importance of communication in a highly complex system. Pilots sharing a flight deck must be familiar with their procedures and tasks to the point of only using key terms, to eliminate extensive exchanges and to ensure "shared understanding and knowledge of the context, and of expected interaction with physical artefacts in the situated context to solve the problem encountered" (H. Kim 2018: 409). The shared repertoire in aviation communication indeed encompasses not only the full range of standard phraseologies but also an array of strategies exercising pragmatic competence, which we discuss below.

- **Pragmatic strategies**

Communication strategies or pragmatic strategies, referred to as *strategic competence* in Doc 9835, are a repertoire of strategies that participants exploit through the co-construction of

their interaction in favour of mutual understanding in attempting to avoid or resolve communication breakdowns or difficulties (A. Cogo/ J. House 2017, J. Kaur 2019, P. Vettorel 2019). With a focus on English as a Lingua Franca (ELF), J. Kaur (2017) defines two categories of misunderstanding in ELF, the first being non-understanding or difficulty in understanding, and the second a mismatch between the speaker's intention and the interlocutor's understanding. Although ELF studies show that many such occurrences are "allowed to pass" (A. Firth 1996), N. Ishihara/ M.C.D.A. Prado (2021) and K. Tsuchiya/ M. Handford (2014) observed that this "let-it-pass" phenomenon may be uncommon in high-stakes specialized professional meetings or in aviation communications, where transmission of crucial information is prioritized.

J. Kaur (2017) notes that the majority of misunderstandings in her data concern some form of ambiguity, and that this is not unique to NNESs – it is a characteristic of communication in general. J. Kaur (2011) uncovers explicitation techniques in which participants exploit strategies of self-repair to improve communication clarity. Similarly, R.M. Delli/ J. Kaur /P.S. Lai /F.P. Dumanig (2022) showed that in another high-stakes professional context, pharmacists use self-repair, either self-initiated or motivated by others, to enhance safety in medical treatment.

Relevant to pragmatic strategies, issues of (in)directness and explicitness also become a crucial part of the shared contextual knowledge in aeronautical R/T communication. Although M. Bieswanger (2013) offers instances of NES pilots expressing non-understanding of instructions given by NES controllers from other inner-circle countries (e.g. a British pilot telling a US air traffic controller that he cannot understand his accent, p.23), most examples of problematic exchanges in his study occur between NESs and NNESs. A. Borowska (2020: 11) also examined the implications, or cultural expectations, built on local needs that are not shared by an international interlocutor. She criticized US controllers for demonstrating a dominant attitude and imposing their own cultural practices when dealing with NNES pilots, illustrated in utterances such as "I don't need you to tell me what I can see and you can't", issued by a controller in New York in 2016. Such expectations may be considered as (im)politeness in R/T communications: N. Ishihara and H.E. Lee (2021) show that what may be intended as attempts to build rapport through relational language might be perceived as verbose (i.e. using more words than necessary) and ambiguous by some pilots. This perception in turn may impede mutual understanding, but could be mitigated through the use of ELF communicative strategies (N. Ishihara/ H.E. Lee, 2021, N. Ishihara/ M.C.D.A. Prado 2021).

In the incident analysed in this paper, we will demonstrate that miscommunication might have been avoided if the participants had practiced the communication strategies established as necessary in the aviation community of practice.

2. Method

2.1. Data

A YouTube video with a transcript for the partial audio recording of the transmissions between NCR891 and Narita ATC was created and posted by an anonymous vlogger who hosts the YouTube channel *You can see ATC*. A link to that video was posted for discussion on the International Civil Aviation English Association LinkedIn feed in August 2021. Although the transcript displayed on the YouTube video is useful for understanding the incident, it contained some inaccuracies due to the difficult audio. Before starting the analysis,

it was crucial to have errors in the transcript corrected. When contacted, *You can see ATC* generously agreed to make their transcript available for research. The transcript was first combined with the video timestamps and then manually corrected by Estival in an iterative process involving consultation with several linguists to ascertain the perceived native language and accent of the speakers in the audio data, complemented by semi-structured interviews with aviation experts to confirm corrections and operational procedures. Following standard practice, the transcript is divided into turns (indicated by #), corresponding to individual radio transmissions (see Appendix A). A transmission is defined as one utterance by one speaker, bounded by either a transmission from another speaker or by silence. One critical correction to the transcript (in #18 and #20) was confirmed through the interviews with aviation experts, as described below.

After careful analysis of the audio data, it was established that two pilots are heard in the audio recording. One pilot (labelled NCR-1) is heard first (#1 to #12), and a second one (NCR-2) takes over at 01:36. Both pilots were assessed to be native U.S. English speakers, with very similar accents, by experienced linguists who are themselves native speakers of US English. There are five air traffic controllers: first a female air traffic controller from Tokyo Control (CONT-F) then a male air traffic controller from Tokyo Control (CONT-M1), followed by another male air traffic controller from Control (CONT-M2), and a male controller from Approach (APP) and finally a male air traffic controller from Tower (TOWER). A Japanese linguist assessed that all the air traffic controllers were native Japanese speakers.

2.2. Interviews with aviation experts

To ascertain the operational interpretation of the recording of the incident, it was necessary to obtain the additional opinion of aviation experts. We employed purposeful sampling to recruit aviation specialists, including some with knowledge of and experience with the Narita airspace. Four pilots and three air traffic controllers with a range of experience were interviewed to confirm or correct the transcript and to help with the interpretation of the incident. Before the interviews, written consent from the participants was obtained and they filled out a background survey, regarding the flight licenses or operational ratings held and the number of flight hours or length of time as air traffic controllers, as well as their linguistic background.

These experts were provided with prepared questions asking about any discrepancies perceived between the audio recording and the transcript, about their interpretation of the intentions of the speakers in specific turns (#18, #20, #21), what they thought the sources of communication difficulty in that incident were, their assessment of the radio performance of the pilots and air traffic controllers, and their expectations of correct radio procedures. As the interview progressed, we asked follow-up questions, such as the language training pilots and air traffic controllers typically receive in their countries and what terms are used to notify an emergency (e.g., MAYDAY, PAN PAN, or Emergency).

Because the three researchers and seven participants were in different international locations, most interviews were conducted online. They ranged from 20 to 60 minutes and were conducted in English unless both interviewer and interviewee shared another first language. Table 1 shows relevant demographic information about the participants.

Participant	Experience; locations	Dominant language(s)	ICAO level
Pilot-1	ATPL (24 years; 18,600 hours); China, South and Central Americas	Brazilian Portuguese	4
Pilot-2	CPL (APTL training); USA	Korean/English	6
Pilot-3	ATPL (16 years); Japan	Japanese	6
Pilot-4	ATPL (5 years; 1500 hours); Japan, Saipan	Japanese	4
ATC-1	15 years; Brazil	Brazilian Portuguese	6
ATC-2	11 years; Australia	English (South Africa, Australia)	6
ATC-3	46 years; Japan (18 years in Tokyo Control)	Japanese	4

Table 1. Aviation experts interviewed.

In summary, the four pilots based in China, USA, and Japan ranged in experience from being in training to 24 years, flying in different international locations, with Pilot-3 and Pilot-4 having extensive experience with Narita Airport. The three air traffic controllers were located in Brazil, Australia, and Japan, with experience ranging from 11 to 46 years. ATC-3 had served in the Tokyo Air Traffic Control Center for a total of 18 years and was the most familiar with the context of the incident.

The video- and audio-recordings of the interviews were transcribed, translated into English if necessary, and cross-checked by all three researchers. The answers from the participants were deductively coded for corrections to the transcript, identification of the sources of communication difficulties, and suggestions for improvements to the R/T communication in this incident.

2.3. Data Coding

Once the orthographic transcript (given in the Appendix) which the research is based on had been corrected with the assistance of the aviation experts, the data was coded according to the methodology employed by B.R.C. Molesworth/ D. Estival (2015), Q. Wu/ B.R.C. Molesworth/ D. Estival (2019), D. Estival/ B.R.C. Molesworth (2020), and Y.H.P.S.A.Y. Dissanayaka/ B.R.C. Molesworth/ D. Estival (2022). Actual transmissions are compared with what aviation professionals predict should be the *expected* transmissions in that context (shared knowledge) and discrepancies are labelled as to the type of deviation observed (*Incorrect* or *Omitted*). The current study extends that methodology by categorising deviations from SP into *Incorrect*, *Omitted* and *Additional*, with two sub-categories for additional verbal material, *Relational* and *Extraneous*, as described in section 4.2.

3. Interpretations by the aviation experts

The main goal of this project was to determine the specific sources of the communication difficulties in this incident, as perceived by stakeholders. During the correction of the transcript, one crucial error in the original video caption was particularly important and relevant to the communication difficulty being investigated. For this reason, the correction of the

original transcript was the topic of one of the questions posed to the aviation experts. The question concerned the exact wording of #18 and #20, when the air traffic controller asked about the vector the pilot had requested. As evidenced by the pilot's answers in #19 and #20, she was not understood. Examples (1) and (2) give the final transcript, with the interpretations provided by the aviation experts interviewed.

(1) #18 ATC National Cargo 891, *do you accept South vector or North vector*? Which do you accept?
#19 Pilot Say that again.

(2) #20 ATC National Cargo 891, *do you request South vector to go back to Narita or North vector…*
#21 Pilot That's affirmative, short vector.

The original YouTube transcript for #18 was *Do you accept close vector or …? Which do you accept?*. Similarly for #20, the air traffic controller's transmission was originally transcribed as *Do you request close vector to go back to Narita ...?*. Six participants attested that the air traffic controller must have said *South vector* and *North vector* in #18 and #20. The original transcript was corrected accordingly and the following discussion about the communication difficulties that ensued is based on this premise.

Although *South vector* and *North vector* are not SP, all the participants explained that the controller probably wanted to give the pilot a choice whether to turn left or right. As the aircraft was flying West, these would be turns to the South or to the North. More specifically, ATC-3, who had worked at the Tokyo Air Traffic Control Center, further explained that the Kanto Sector is wide East-West but narrow North-South. If the aircraft turned right (to the North) it would enter another sector, the Tohoku North-Eastern Sector, and the air traffic controller would need to make an adjustment with that sector. If the aircraft turned left inbound (to the South), it would remain in the Southern Region within the Kanto Sector, requiring no such adjustment.

Although NCR-1 initially reported a fire alarm in #8 (1:06), repeating it in #10 and #12, and NCR-2 repeated it in #13 and #15, the air traffic controller did not understand the emergency until #16. In #18 and #20, she did not provide a vector, as requested by the pilots. When she finally did so in #22 (2:14), more than a minute (1:08) had elapsed since the initial request. All the participants addressed this point, considering a major issue to be the pilots' verbosity and deviations from phraseology. More specifically, the participants stated that the pilots should have said *Request return*, or *Divert*, rather than repeating *vector back* multiple times. They should also have said *fire warning* or *fire alarm* rather than *fire cargo aft*, which is the direct read-out of the warning message in that aircraft and only understood by pilots who operate that type of aircraft. They also pointed out that the pilots should have given their call sign more often, used appropriate phraseology such as MAYDAY or PAN PAN, and squawked the code 7700 on the transponder to clearly indicate an emergency. Indeed, Pilot-1 pointed out that the pilot's initial report of the problem in #9 was not sufficiently assertive to indicate the urgency and was too technical, i.e., not part of the shared knowledge within the aviation community. All the participants stated that the pilots were being excessively verbose, and not properly using aviation phraseology.

Furthermore, the participants also stated that the pilots did not use communication strategies (e.g. rephrasing or simplifying), nor accommodation strategies (e.g. they did not slow

down even though the air traffic controller asked several times to 'say again' and they did not spell out key words). Along these lines, Pilot-3 mentioned that NES pilots "need to understand that Aviation English is not the same as Common English", and noted the lack of awareness of the challenges faced by NNES air traffic controllers, suggesting that not using accommodation strategies might be related to this lack of awareness. Pilot-4 also suggested that "the pilot didn't know what English as an international language was like".

However, the participants also acknowledged limitations on the part of the air traffic controllers, especially the first one (CONT-F). Her weak English comprehension was pointed out by all of them: she missed crucial aviation terms like *fire* in #8 (1:06) and *emergency* in #15 (1:44), taking too long (47 seconds) to understand the pilot's request to return to Narita in #16 (1:53). They suggested that her non-comprehension of these key terms might be attributed to her lack of experience as an air traffic controller. Her strong accent was also considered problematic (by Pilot-4, ATC-1, ATC-2, ATC-3) even though non-comprehension of her transmissions was only indicated by NCR-2 in #19 and #21. The participants stated that CONT-F did not use communication strategies (e.g., rephrasing, compensatory strategies), and also noted that she did not use accommodation strategies; she did not slow down nor pause, which might have improved her intelligibility.

Additionally, ATC-3 indicated that CONT-F did not request necessary assistance from colleagues in a timely manner, although she was eventually replaced by a more experienced controller. ATC-3 suggested that she might have been a controller in training and, if that was the case, the air traffic controllers in her sector were perhaps not achieving desired coordination.

4. Data analysis

We now present the analysis of the R/T communication in this incident, following the method described in 2.3. The data contains a total of 118 transmissions, 60 by the pilots and 58 by ATC, including 14 inaudible/bad audio (all ATC).

4.1. Misunderstandings

Out of 118 transmissions, nine were not understood and three were only partially understood. These 12 transmissions are considered for further analysis in the next sections. Of the transmissions that were not understood, seven were from the pilots and two from ATC. One of these (#49, Pilot) was probably understood but that cannot be ascertained as the reply from ATC (#50) is inaudible, and another (#90, Pilot) was incomplete and did not receive a reply from ATC. Of the transmissions that were only partially understood, two were from the pilots and one from ATC.

4.1.1. Partial understanding

Three transmissions were only partially understood. As shown above in (2), #20 from ATC, which contains the difficult phrases *South vector* and *North vector*, was only partially understood by the pilot. As shown in (3) and (4) below, #15 and #25 from the pilots were not fully understood by ATC, who replied with #16 and #26 respectively.

(3) #15 Pilot Yeah, we'd like a vector back, we're declaring an emergency at this time. We've got a fire cargo aft. And we'd like to return to Haneda or Narita.
#16 ATC National Cargo 891, confirm, you request back to Narita Airport?

(4) #25 Pilot Yes, sir, we got a fire cargo aft and we'd like vectors to the nearest airport.
#26 ATC National Cargo 891, confirm, do you request return back to Narita?

Both #15 and #25 contain significant deviations from expected SP (see section 4.2).

4.1.2. Non-understanding

The two ATC transmissions that were not understood by the pilots are #18, given earlier in (1), and the inaudible #50. As discussed above, #18 was the most difficult segment of the audio to understand and transcribe because of the strong Japanese accent of the air traffic controller. The interpretation *South vector or North vector* was confirmed by the Japanese ATC and pilots interviewed, and accepted by the other participants.

The seven pilot transmissions which were not understood by ATC are listed in (5). Five of these (#1, #8, #10, #12 and #86) contained significant deviations from SP, while the other two (#12 and #94) are also somewhat deviant (see section 4.2).

(5) #1 Pilot National Cargo 891, with you, climbing two one zero (210) for two four zero (240) and requesting flight level - about three seven zero (370).

#8 Pilot And ATC, National Cargo 891, uh we got a fire cargo aft warning, we'd like a vector back to Narita.

#10 Pilot Can you give us a vector back to Narita at this time?

#12 Pilot We're going down. Yeah, get a vector back to the airport.

#13 Pilot To Narita, National Cargo 891.

#86 Pilot Negative, National Cargo 891. Only inform them do not open any cargo doors until notified.

#94 Pilot ninety thousand (90000), National Cargo 891.

4.2. Deviations from Standard Phraseology

SP is strictly prescribed and must be followed as much as possible in all R/T communications, with safety as the ultimate goal. As noted earlier, SP forms part of the repertoire of the shared knowledge of this CoP. Deviations from SP are tolerated to a certain extent and are to be expected in non-routine situations. One important question is how much deviation is necessary. Indeed, in situations where no phraseology has been defined, pilots and air traffic

controllers are advised to use 'plain English'; this is not to be taken as conversational or general English but must follow phraseology as closely as possible and in all cases, must be clear, concise and non-ambiguous (ICAO 2010).

Applying the methodology described above (section 2.3) to analyse aviation communication, the observed transmissions are compared with the expected phraseology as per aeronautical publications (e.g. AIP 2020) in that context and coded for deviations. In the data under study, a total of 68 deviations were found in the 118 transmissions available for this incident, i.e., an average of 0.58 deviations per transmission. As shown in Table 2, seven deviations occurred in the 58 ATC transmissions (average: 0.12 deviations per ATC transmission) while 61 deviations occurred in the 60 pilot transmissions (average: 1.02 deviations per pilot transmission). Importantly, there were 25 deviations from expected SP in the 12 transmissions that were not, or only partially, understood (average: 2.08 deviations per transmission).

Speaker	Number of transmissions	Number of deviations	Average number of deviations per transmission
ATC	58	7	0.12
Pilot	60	61	1.02
TOTAL	118	68	0.58

Table 2. Deviations from SP per transmission.

A Poisson comparison of rates test provides an Estimate rate ratio of 0.1147541 (i.e. the pilots make 10 times more deviations than ATC), with a p-value of 7.387e-12; so we can conclude the ratio of rates is < 1 and that pilots make more deviations than ATC at the 5% significance level.

To analyse how these deviations contributed to the communication difficulties, they were categorised into the two types of errors proposed by B.R.C. Molesworth/ D. Estival (2015). These are *Incorrect*, when the speaker used words different from the SP defined for that situation, and *Omitted*, when the speaker does not read back or state information required by SP in that situation.

In addition, to quantify the verbosity noted by the aviation experts, the current study also categorised additional verbal material which is not part of the SP. For example, in (6), the pilot said (a) instead of the expected (b) in #10.

(6) #10 Pilot a. Can you give us a vector back to Narita at this time?
b. [Expected] Request vectors to Narita, National Cargo 891.
#11 ATC National Cargo 891, say again.

There are seven additional words in (#10.a): four in the politeness formula *Can you give us*, and three in the unnecessary expression *at this time*. Therefore, the number of words in each deviation was counted, the rationale being that each additional word increases the length of the speech signal and thus may make it more difficult for the recipient to identify the important words that need to be attended to. The seven unexpected words in #10 would make it harder for ATC to extract the crucial words *vector back to Narita*, as evidenced by #11, in which CONT-F requested *Say again*.

A common type of deviation from phraseology is the use of politeness markers, such as *good day* or *thank you*. While they increase the duration of the speech signal, they are argued to be useful in general conversation, as they help smooth interactions by creating a better inter-personal relation between the interlocutors. This has also been suggested to be the case in aviation communication in spite of the strict constraints limiting the vocabulary to be used. M. Bieswanger (2013) argues that the concept of 'face', defined as a constructed self-image (E. Goffman 1967) and employed in Politeness Theory (P. Brown/ S. Levinson 1987), is relevant to aviation communication in both intra- and intercultural contexts (N. Ishihara/ H.E. Lee 2021). Therefore, the current study categorises additional verbal material into *Extraneous*, covering words or phrases that contain content which is irrelevant or unnecessary, and *Relational* for material that does not add content but which has a relational purpose, that of assisting in building rapport in a joint enterprise in the aviation community of practice (e.g., politeness markers). Table 3 details the four types of deviations, with examples from the data under study.

Deviation type	**Examples**	**Explanation**
Incorrect	*Sixteen*	uses incorrect phraseology (should be 'one six' as a Runway designator)
Omitted	*MAYDAY*	does not use existing phraseology
Additional-Extraneous	*at this time; we'll tell Tower; that is (affirm*)	content is irrelevant or unnecessary
Additional-Relational	*we'd like…*	does not add content, but aims to build relationship

Table 3. Deviations from Standard Phraseology.

The distribution of the types of deviations in the transmissions from ATC and pilots in the incident under study is shown in Table 4.

Deviation type	**Number of deviations**	**ATC**	**Pilot**
Incorrect	20	0	20
Omitted	8	0	8
Additional-Extraneous	27	3	24
Additional-Relational	13	4	9
TOTAL	68	7	61

Table 4. Distribution of deviation types between Pilots and ATC.

In the 118 transmissions comprising the whole conversation, there were 161 additional words, i.e., an average of 1.34 additional words per transmission. These additional words, however, are not evenly distributed between pilots and ATC. As shown in Table 5, 34 additional words are found in the 58 ATC transmissions (average: 0.59 additional words per ATC transmission) and 127 additional words in the 60 pilot transmissions (average: 2.1 additional words in pilot transmissions). The contrast between ATC and pilot transmissions

regarding the number of deviations from SP and additional verbal material in their transmissions is striking.

Speaker	Number of transmissions	Number of additional words	Average number of additional words per transmission
ATC	58	34	0.59
Pilot	60	127	2.1
TOTAL	118	161	1.36

Table 5. Additional words in transmissions.

A Poisson comparison of rates test provides an Estimate rate ratio of 0.2677165 (i.e. the pilots use 4 times more additional words than ATC), with a p-value of 7.915e-14; so we can conclude the ratio of rates is < 1 and that pilots use more additional words than ATC at the 5% significance level.

Perhaps more importantly, 78 out of the 161 additional words (i.e. any words not found in the SP, as described above) in the whole interaction occurred in the transmissions that were not understood or were only partially understood, i.e. an average of 6.5 additional words when the transmissions are misunderstood. Again, this is a striking illustration of the negative impact of verbosity in aviation communication.

4.3. Deviations from Standard Phraseology and misunderstandings

A more detailed analysis of the deviations from SP in the transmissions that were not understood or only partially understood shows that they contain the three types of deviations: missing words, incorrect words, and additional words. Table 6 lists these deviations. As noted above, #18 is also noticeable for the strong accent of CONT-F. #82 is the only transmission not understood but without any deviation or transmission problem.

#1 (Pilot)	3 additional words	*with you, about*
	1 incorrect word	*for* (in front of numbers)
#8 (Pilot)	11 additional words	*And ATC, we got a fire cargo aft warning, we'd like,*
	1 incorrect word	*ATC* (should be 'Tokyo Control')
	SP missing	*MAYDAY*
#10 (Pilot)	7 additional words	*Can you give us a, at this time*
	SP missing	*REQUEST*
#12 (Pilot)	4 additional words	*We're going down. get*
	SP missing	*MAYDAY, REQUEST*
#13 (Pilot)	SP missing	*REQUEST*
#15 (Pilot)	21 additional words	*we'd like, we're declaring an emergency at this time. We've got a, cargo aft. And we'd like to*
	SP missing	*MAYDAY, REQUEST*
#18 (ATC)	7 additional words	*do you accept. Which do you accept?*
	Strong Japanese accent	

#25 (Pilot)	9 additional words	*Yes, sir, we got a, cargo aft and we'd like*
	SP missing	*REQUEST*
#49 (Pilot)	5 additional words	*Yes, we request emergency equipment*
	SP missing	*AFFIRM*
#50 (ATC)	(inaudible)	
#82 (ATC)	(audible and correct)	
#86 (Pilot)	11 additional words	*Only inform them do not open any cargo doors until notified.*
#90 (Pilot)	(incomplete)	*Okay, we request…*
#94 (Pilot)	incorrect number	*ninety thousand* (should be 'nine zero thousand')

Table 6. Deviations or problems in transmissions not or only partially understood.

As pointed out by all the pilots and air traffic controllers interviewed (and many of the more knowledgeable YouTube comments)[2], the crucial errors in the transmissions which were not understood were the missing SP phrases required to convey an emergency (MAYDAY) and to request return to Narita airport (REQUEST), and the non-standard phrases used instead, listed in Table 7.

MAYDAY	*we're declaring an emergency*
REQUEST	*we'd like vectors*

Table 7. Omitted SP and non-standard phrases used.

In addition to the conversational words which the pilots used to convey the meaning of MAYDAY and REQUEST, the pilots also used incorrect words that are specifically disallowed by the SP (Table 8).

for	not allowed in front of numbers
yes	should be 'AFFIRM'
ninety thousand	should be 'nine zero thousand'

Table 8. Incorrect words.

As shown in Table 9, some of the additional words found in the transmissions are unnecessary but fall in the *Relational* category, i.e. words intended to help the interaction, while others only add unnecessary information.

[2] Some examples from the YouTube comments (www.youtube.com/watch?v=UTDdc_CU6fk):
"The controllers here were deemed competent in their English skills. That they didn't understand what the crew was asking for is not their fault. It is the fault of the crew for not using the correct international aviation phraseology (which itself is a problem of the FAA. Many English speaking pilots flying to the US have issues with the FAA ATC staff because the American controllers won't use correct ICAO phraseology)."
"Standardised phraseology is intended to enable clear communication with non native speakers, its not reasonable to expect everyone the world over to speak fluently in English - despite what many commenters may think. 'Mayday, mayday, mayday, request vectors direct Narita' would most likely have been clearly understood by the controller."

Relational	**Extraneous**
with you	*about*
can you give us (SP: REQUEST)	*at this time*
we're declaring an emergency (SP: MAYDAY)	*get*
we'd like (SP: REQUEST)	*cargo aft*
sir	*we've got*
	only inform them
	until notified

Table 9. Additional words.

In the case of *we're declaring an emergency*, as these words were clearly intended to convey important information, they cannot be categorised as Extraneous and were labelled Relational. This indicates that there may be a need to further develop the taxonomy of deviations.

5. Discussion

The results from the data analysis confirm that the expertise required in this community of practice includes using SP as much as possible, as it constitutes shared knowledge and permits mutual understanding between pilots and controllers (participants of the community). Furthermore, keeping utterances concise and using accommodation strategies would have enhanced mutual understanding, as was stressed by all the participants in the interviews conducted for this research.

Use of SP could have alerted the controller about the nature of the emergency once the pilot had stated the problem. The aviation experts interviewed confirmed that the absence of words referring to the status of the aircraft may have prevented a prompt understanding and, therefore, the correct choice of procedures to follow. Additionally, the pilot's use of the expression *fire cargo aft warning*, which is shared knowledge among pilots operating this particular type of aircraft but not extended to air traffic controllers, may have contributed to an increased load of information in those utterances. Accommodation strategies could have been deployed with more effective wording such as *fire warning, fire indication,* or other expressions that would emphasize the possibility of an emergency, and that the pilots did not have a visual confirmation of the fire but only a warning indication.

The data analysis also points to the large number of deviations from SP in the pilots' utterances. Given that the two pilots were assessed as NES, this study confirms that the burden of communication problems does not rely solely on NNES. Despite problems with her pronunciation of English, the Japanese controller was understood most of the time, as evidenced by the fact that the pilots were able to read back, respond to her instructions and request clarification. The fact that the controller could not understand the pilots might be attributed to a 'low comprehension proficiency' level. Our analysis, however, shows other contributing factors such as the pilots' transmissions being too verbose and lengthy, as well as non-standard, and their failure to 'accommodate' to the controller. This prolonged incident of miscommunication, which could have had serious consequences, highlights the importance of adequate training and assessment of aviation communication for all participants in radiotelephony, regardless of where they were born, what language they use at home, and where they obtain their qualifications. All our informants pointed to the need for accommodation, which is already required by ICAO (2010) and ICAO (2016a), but is not taught to pilots deemed fluent in English (i.e. Level 6), and arguably not known by all.

Although we have not analysed the YouTube comments in any detail yet, it was their judgmental nature that prompted us to start investigating this communication. Some of those

comments come from self-identified pilots or air traffic controllers and show aviation expertise, and these partially reflect the views of our informants, but not always, revealing bias within and outside the aviation community of practice. Those comments bring about values that have been built for decades regarding the relative responsibilities of speakers of different languages. We initially tried to avoid the NES/NNES dichotomy, but the bias that often accompanies such categories needs to be addressed and, for this reason, we opted to preserve it as a means of elucidating community practices that perpetuate those concepts.

6. Limitations of this study and future research

One limitation of this study is that the audio data is incomplete because some audio segments are inaudible or unintelligible. Nevertheless, this does not prevent the bulk of the interaction from being interpretable and analysable, and there is enough audible data to conduct an analysis and compare the transmissions produced by the speakers during the incident.

Another limitation is that, because the audio only contains segments pertaining to the incident flight, the timestamps do not reflect real time but are relative to the start of the video. However, no part of the analysis depends on temporal interpretation and no conclusions are drawn from the timestamps.

While we are aware that nativeness should preferably be determined by self-identification, this is not always possible and would not be feasible in this study. As in other studies of aviation recordings, there is no demographic information about the speakers and the identification of their presumed native language relies on factors such as the location, the nationality of the airline, and expert linguistic knowledge about accents (Q. Wu et al. 2019). Addressing the bias that comes with the terms *native* and *non-native English speakers* as conventionally employed in the aviation community of practice is one of our goals, and we are aware that relying on this terminology could help perpetuate the problematic dichotomy that may not readily be discernible within this community.

A related limitation is that we do not have access to the interpretation of the speakers themselves as to what happened in this incident. Therefore, we interviewed aviation experts to understand exactly what happened and what is expected in this situation. While our informants represent a variety of backgrounds and experience levels, only one of them (Pilot-2) trained in the US. Nevertheless some of the YouTube comments present a clearly self-identified US-based perspective (for instance *As a 33-year Air Force C-5 pilot and 20-year domestic pilot I can say that the use of the word 'Mayday' has only recently been stressed to us.*); they were also used as a resource and confirm the findings from the interviews.

Finally, this study is limited to the close analysis of one interaction, at one location. It is hoped that more incidents of this kind will be studied in depth and will provide more data to support our conclusions, and that this methodology can prove useful for other studies.

Conclusion

In the many commentaries about the Avianca 052 accident in 1990 (e.g. S. Cookson 2011, R.L. Helmreich 1994), but especially in the NTSB report (NTSB 1991), the NNES pilots were criticised for not using MAYDAY or PAN PAN to convey the sense of urgency regarding the amount of fuel they had on board. This was attributed to their "limited English proficiency", although that was recognised as only one of the factors contributing to the accident. The Narita incident studied in this paper shows that not using the correct phraseology in cases of emergency is not necessarily attributable to limited English proficiency but can be a problem even for fluent or native English speakers. Use of SP is within the expected

norms for interactions that take place between pilots and air traffic controllers, and words such as MAYDAY or PAN PAN could have signalled the abnormal situation earlier to the controller in the communication analysed here.

Although Doc 9835 emphasizes that the LPRs are relevant to all participants in radio communications, it fails to impose their use on all the member states. M. Bieswanger (2013: 22) suggests that a possible reason why authorities disregard or underplay the importance of the LPRs in countries where English is an official or de facto language is that "the necessary separation between English as a natural language and the use of English in air traffic control is not explicitly made". One example is that the criteria for ICAO Level 6 Expert Speakers (ICAO 2010) concern General English proficiency (e.g. conversational fluency, ability to use idiomatic language and complex constructions) while the requirements for efficient radiotelephony (ICAO 2007, 2016) demand the use of SP wherever possible, and clear, concise and non-ambiguous 'plain language' when no phraseology is available (see Agência Nacional de Aviação Civil (ANAC-Brazil 2016). This is illustrated by the discrepancy between the public or lay perception of aviation communication and the reality experienced by aviation professionals, with both perspectives being strongly expressed in the YouTube comments. The more knowledgeable comments point out what the pilots should have said and the less informed ones complain about the strong accent of the air traffic controller. It is to be hoped that the current study will contribute to debunk some popular myths, which are due in part to ignorance and prejudice.

Our study shows that the distinction between aviation English and general English is crucial to the identification of the scope of English to be addressed in international radio communications and, therefore, in the language proficiency assessment. Studies comparing aeronautical R/T communication with spoken English have attested that these varieties are prosodically different, with aviation English having a faster articulation rate probably owing to its "restrictive, repetitive and predictable nature" (J. Trippe/ M. Baese-Berk 2019: 41). H. Kim (2018) observes that good command of radio skills is more dependent on operational experience than on language proficiency. Whereas the English Language Proficiency of non-native English speakers is assessed before they are allowed to operate in the aviation environment, professional competency, crucial in aviation training, is not tested or assessed with regard to the communicative competence of native English speakers. Importantly, accommodation and communication strategies, which are required in order to first identify and then repair misunderstandings in aviation communication, must be taught to all participants and tested as part of the shared knowledge in the community of practice. As suggested in M. Bieswanger (2016), the registers that constitute radio communications, namely standard aeronautical phraseology and plain (aviation-related) language, are specialized registers and, as such, are not part of anybody's native language (M. Bieswanger 2019, D. Estival 2019, D. Estival et al. 2016). They must therefore be learned by all participants – and tested.

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Appendix A – NCR891 Transcript

#	time	P/A	Speaker	Transcript
1	00:17	Pilot	NCR-1	National Cargo 891, with you, climbing two one zero (210) for two four zero (240) and requesting flight level - about three seven zero (370).
2	00:28	ATC	CONT-F	National Cargo 891, Tokyo Control, say again requested altitude.
3	00:35	Pilot	NCR-1	Uh… We request… I'm sorry, let's change it to Flight Level three four zero (340).
4	00:41	ATC	CONT-F	National Cargo 891, climb and maintain Flight Level three four zero (340).
5	00:45	Pilot	NCR-1	Okay, three four zero (340), National Cargo.
6	00:53	ATC	CONT-F	National Cargo 891, cleared direct to SAPRA, Sierra Alpha Papa Romeo Alpha, SAPRA.
7	00:59	Pilot	NCR-1	Cleared direct to SAPRA, National Cargo 891. Arigato gozaimasta.
8	01:06	Pilot	NCR-1	And ATC, National Cargo 891, uh we got a fire cargo aft warning, we'd like a vector back to Narita.
9	01:13	ATC	CONT-F	National Cargo 891, sorry, say again, please.
10	01:16	Pilot	NCR-1	Can you give us a vector back to Narita at this time?
11	01:20	ATC	CONT-F	National Cargo 891, say again.
12	01:28	Pilot	NCR-1	We're going down. Yeah, get a vector back to the airport.
13	01:36	Pilot	NCR-2	To Narita, National Cargo 891.
14	01:39	ATC	CONT-F	National Cargo 891, say again your concern about the airport.
15	01:44	Pilot	NCR-2	Yeah, we'd like a vector back, we're declaring an emergency at this time. We've got a fire cargo aft. And we'd like to return to Haneda or Narita.
16	01:53	ATC	CONT-F	National Cargo 891, confirm, you request back to Narita Airport?
17	01:57	Pilot	NCR-2	That's affirmative.
18	01:59	ATC	CONT-F	National Cargo 891, do you accept South vector or North vector? Which do you accept?
19	02:04	Pilot	NCR-2	Say that again.
20	02:05	ATC	CONT-F	National Cargo 891, do you request South vector to go back to Narita or North vector…
21	02:12	Pilot	NCR-2	That's affirmative, short vector.
22	02:14	ATC	CONT-F	National Cargo 891, turn left heading one eight zero (180), vector to Narita.

23	02:18	Pilot	NCR-2	Heading one eight zero (180), vector to Narita, National Cargo 891.
24	02:24	ATC	CONT-M1	National Cargo 891, Tokyo Control.
25	02:27	Pilot	NCR-2	Yes, sir, we got a fire cargo aft and we'd like vectors to the nearest airport.
26	02:32	ATC	CONT-M1	National Cargo 891, confirm, do you request return back to Narita?
27	02:36	Pilot	NCR-2	That's affirmative, National Cargo 891.
28	02:39	ATC	CONT-M1	Roger, request reason.
29	02:40	Pilot	NCR-2	We've got a fire cargo aft.
30	02:43	ATC	CONT-M1	Confirm fire alarm in cargo?
31	02:48	ATC	CONT-M1	OK. National Cargo 891, confirm, do you re- request emergency landing?
32	02:54	Pilot	NCR-2	Emergency landing, that's correct.
33	03:01	ATC	CONT-M2	National Cargo 891, roger, now this time maintain FL...uh, what altitude do you request?
34		ATC		[*We're unable to hear the controller in the next short part of communications. But it's easy to understand what they were talking about from the words of pilot. Continue watching*.][3]
35		ATC		COMMENTS: Pilot was instructed to turn on heading 180 and to maintain FL180.
36	03:16	Pilot	NCR-2	Okay, heading one eight zero (180), maintain altitude one eight zero (180), National Cargo 891.
37		ATC		*[It seems that controller asked about the nature on the emergency.]*
38	03:25	Pilot	NCR-2	That is affirm, fire cargo aft, National Cargo 891.
39		ATC		*[Pilot was instructed to turn on heading 160.]*
40	03:35	Pilot	NCR-2	Heading 160, National Cargo 891.
41		ATC		[*Pilot was instructed to change frequency.]*
42	03:42	Pilot	NCR-2	one thirty two forty five (132.45), National Cargo 891.
43	03:48	Pilot	NCR-2	And Control, National Cargo 891, they sent us back to you, we're descending, and leveling at one eight zero (FL180).
44		Pilot		[*Pilot was instructed to turn on heading 150.]*
45	04:00	Pilot	NCR-2	Left, turning 150, National Cargo 891.
46		ATC		[*Pilot was instructed to turn on heading 180.]*
47	04:09	Pilot	NCR-2	Okay, right turn 180, National Cargo 891.

[3] The text given in italics are the comments from "You can see ATC" on the original video. Even after professional enhancing, the audio for those turns was not intelligible.

48		ATC		*[It seems that controller asked pilot if they needed any assistance on the ground.]*
49	04:15	Pilot	NCR-2	Yes, we request emergency equipment, National Cargo 891.
50		ATC		*[Probably controller asked about the nature of the emergency (not sure).]*
51	04:21	Pilot	NCR-2	Say again.
52	04:24	Pilot	NCR-2	That is affirm, National Cargo 891.
53		ATC		[*It seems that controller asked about their requests.]*
54	04:30	Pilot	NCR-2	Well, we request direct to the airport at this time, we declared an emergency, National Cargo 891.
55		ATC		*[Pilot was instructed to turn on heading 090.]*
56	04:41	Pilot	NCR-2	Okay, 090, National Cargo 891.
57		ATC		*[Pilot was instructed to turn on heading 070.]*
58	04:48	Pilot	NCR-2	Okay, 070, National Cargo 891.
59		ATC		*[Pilot was informed about the active runway at Narita Airport.]*
60	04:53	Pilot	NCR-2	Okay, one six right (16R), National Cargo 891.
61	05:00	ATC	CONT-M2	National Cargo 891, descend and maintain FL150.
62	05:06	Pilot	NCR-2	Okay, that's 150, National Cargo 891.
63	05:12	ATC	CONT-M2	National Cargo 891, descend, descend and maintain eight thousand (8000) and Narita QNH two nine six two (2 9 6 2).
64	05:19	Pilot	NCR-2	eight thousand (8000), two nine six two (2 9 6 2), National Cargo 891.
65	05:25	ATC	CONT-M2	National Cargo 891, Tokyo Control.
66	05:28	Pilot	NCR-2	Go, sir.
67	05:29	ATC	CONT-M2	Yes, so we have already coordinated to Narita Airport to ready to fire vehicles. And do you need another any assistance?
68	05:45	Pilot	NCR-2	No, just fire trucks, that’s all we need, National Cargo 891.
69	05:51	ATC	CONT-M2	National Cargo 891, already standing by fire vehicles at Narita Airport.
70	05:59	Pilot	NCR-2	Roger.
71	06:01	ATC	CONT-M2	National Cargo 891, at this time contact Tokyo Ap- contact Tokyo Approach one two zero decimal two (120.2), one two zero decimal two (120.2).
72	06:10	Pilot	NCR-2	two zero decimal two, National Cargo 891.

73	06:16	Pilot	NCR-2	And Approach, National Cargo 891, out of twelve (12000) for eight (8000).
74	06:21	ATC	APP	National Cargo 891, Tokyo Approach, roger, information Lima, QNH 2 9 6 4, expect ILS Yankee Runway one six right (16R) approach.
75	06:31	Pilot	NCR-2	one six right (16R) approach, National Cargo 891.
76	06:35	ATC	APP	National Cargo 891, descend and maintain eight thousand (8000).
77	06:38	Pilot	NCR-2	eight thousand (8000), National Cargo 891.
78	06:42	ATC	APP	National Cargo 891, continue present heading, vector ILS Y RW 16R final approach course.
79	06:48	Pilot	NCR-2	Roger, continue present heading, National Cargo 891.
80	06:51	ATC	APP	National Cargo 891, uh request persons on board.
81	06:57	Pilot	NCR-2	We have six persons, souls on board, National…
82	07:00	ATC	APP	six, roger and request uh remaining fuel at the time of landing, please.
83	07:06	Pilot	NCR-2	Okay, we'd like to continue descent, National Cargo 891.
84	07:11	ATC	APP	National Cargo 891, maintain eight thousand (8000) and… (ex?)
85	07:24	ATC	APP	National Cargo 891, confirm, do you need any fuel dumping?
86	07:29	Pilot	NCR-2	Negative, National Cargo 891. Only inform them do not open any cargo doors until notified.
87	07:38	ATC	APP	National Cargo 891, say again last part.
88	07:40	Pilot	NCR-2	Upon landing do not have them open any doors, National Cargo 891, we'll tell Tower.
89	07:47	ATC	APP	National Cargo 891, roger.
90	07:50	Pilot	NCR-2	Okay, we request…
91	07:54	ATC	APP	National Cargo 891, descend and maintain four thousand (4000).
92	08:00	Pilot	NCR-2	four thousand (4000), National Cargo 891.
93	08:04	ATC	APP	National Cargo 891, expect about 5 minutes before landing. Request remaining fuel at the time of landing.
94	08:14	Pilot	NCR-2	ninety thousand (90000), National Cargo 891.
95	08:22	ATC	APP	Confirm ninety thousand (90000)?
96	08:25	Pilot	NCR-2	Affirm, ninety thousand (90000) kilograms.
97	08:28	ATC	APP	Thank you. And do you have any HazMats on board?
98	08:35	Pilot	NCR-2	Affirm, National Cargo 891.

99	08:39	ATC	APP	What type of HazMats on board?
100	08:43	Pilot	NCR-2	Lithium batteries, National Cargo 891.
101	08:46	ATC	APP	Batteries, copied.
102	08:49	ATC	APP	National Cargo 891, turn left heading zero five zero (050).
103	08:53	Pilot	NCR-2	zero five zero (050), National Cargo 891.
104	08:59	ATC	APP	National Cargo 891, descend and maintain two thousand eight hundred (2800).
105	09:04	Pilot	NCR-2	Descend and maintain two thousand eight hundred (2800), National Cargo 891.
106	09:11	ATC	APP	National Cargo 891, turn left heading zero three zero (030).
107	09:15	Pilot	NCR-2	zero three zero (030), National Cargo 891.
108	09:19	ATC	APP	National Cargo 891, turn right heading zero seven zero (070).
109	09:22	Pilot	NCR-2	zero seven zero (070), National Cargo 891.
110	09:30	ATC	APP	National Cargo 891, turn right heading one three zero (130), three (3) miles to PERCH, cleared ILS Y RW one six right (16R) approach.
111	09:37	Pilot	NCR-2	Okay, heading 130, cleared for the 16R approach, National Cargo 891.
112	09:48	ATC	APP	National Cargo 891, contact Narita Tower one one eight decimal two (118.2).
113	09:56	Pilot	NCR-2	eighteen two (18.2), National Cargo 891.
114	10:03	Pilot	NCR-2	Tower, National Cargo 891, ILS sixteen right (16R) and we request that - no doors to be opened during landing, after we land.
115	10:20	ATC	TOWER	*[unintelligible, probably "Cleared to land 16 Right, National Cargo 891"]*
116	10:22	Pilot	NCR-2	Cleared to land one six right (16R), National Cargo 891.
117	10:34	Pilot	NCR-2	and Tower, do you see any smoke or fire from our aircraft?
118	10:41	ATC	TOWER	National Cargo 891, … no smoke.