

CLEAR, CONCISE, SIMPLE, DIRECT, UNAMBIGUOUS

항공무선통신에서 요구하는 의사소통 능력이란

상대방이 알아 들을 수 있는 발음(P)으로	의미를 전달하기에 적합한 단어(V)를 사용하여	의미가 구체적으로 완성될 수 있도록 문장(S)을 구성
상대방의 이야기는 정확하게 이해하는 수 있는 능력을 갖추고	상대방이 알아듣기 쉽게 자연스럽게 표현하고 발음하며	
	주파수의 효율성을 고려하여 요지를 간결하게 전달할 수 있는 능력이 필요함.	
	또한 못 알아 들었을 때는 다시 되묻는 것을 두려워 하지 말고,	
	상대방이 Confirm 하지 않도록 애매모호한 표현은 자제하면서	
	영어를 못하는 상대방도 이해할 수 있도록 배려하여 교신할 수 있는 능력	

1. 이해 관련

(1) “상황 / 지시 / 교신”은 각각 정확하게 인지하셔야 합니다.

- ① 상황: 문답에 관련된 항공기, 관제소 및 시설의 상황을 설명합니다. 상황에 제시되지 않은 것을 상상, 가정하여 응답하면 상황에 어긋나는 대답으로 간주됩니다.
- ② 지시: 어떤 응대를 해야 할지 한정합니다. 지시에 따라 대답 하시기 바랍니다.
 - ※ “☞” 손가락 표시가 해당 문제의 지시문입니다.
 - ※ 만약 지시가 “Contact Tower”이면, Tower에 교신을 하라는 의미입니다. 이때, “Contact Tower”를 그대로 따라 읽으면, 어색한 대답으로 간주됩니다.
 - ※ 예를 들어, 조종사용 시험에서 “Respond positively”라는 지시가 나오면 반드시 긍정적으로 응대해야 하며, 이 경우에 Unable, Negative 등 부정 또는 거부의 의사로 응대하면 지시에 맞지 않는 대답으로 간주됩니다.
 - ※ 최초 교신 시는 항상 상대 Station(항공기, 관제기관)을 불러야 합니다.
- ③ 교신: 상대방이 먼저 교신을 해오고 이에 응대하는 문제인 경우, 교신을 듣고 상황과 지시에 알맞게 응대해야 합니다.

[감점고려 사례 예시]

- (a) 상황이나 지시에 나온 내용을 무작정 따라 읽는 경우, 문제의 취지에 맞지 않는 대답이 될 수 있습니다. 상황과 지시를 이해하고, 내용을 적절하게 다듬고 바꾸어 대답하시기 바랍니다.
예를 들어, ATC가 “YOU”로 지칭한 내용은, 적절하게 “ME”로 바꾸어 대답해야 합니다.
- (b) 문제의 지시가 “contact Ground control and explain your situation.”라면, ‘contact’을 빼고 “Ground”라고 지상관제소를 호출한 후 이하 대답이 이어져야 하고, 교신에서 관제사가 “contact Ground on 121.4”라고 했으면, 조종사는 이에 대한 복창을 “Contact Ground control 121.4”라고 합니다.
- (c) P1TA : 정확한 리드백. 실제 교신상황에서 “바빠서 못한다”, “실제 비행에서는 표준아닌 방식으로 해도 다 알아 듣는다.” 등의 이유로 생략하거나 단순화 하는 것은 바람직하지 않습니다. 시험 상황에서도 정확한 용어 사용해 보시길 권장합니다.

④ 안전과 관련된 사안

호출부호 오류, 고도/속도/기수, 위치정보, 활주로/유도로 정보, 중요한 지시사항 등 항공 안전과 직결되는 사안에서는 단순 실수인 경우에도 엄격하게 채점

☞ 실제 비행에서 오해를 발생시키고 위험한 비행 상황을 유발할 가능성 多

- ☑ FL150 ↔ 15,000ft, 1,500ft
- ☑ twelve thousnd ft ↔ one thousand two hundred. ↔ twenty thousand ↔twenteen thousand (1,200을 잘 못 이야기하는 다양한 사례)
- ☑ fifty ↔ fifteen(50 vs 15) miles
- ☑ Turn right heading 150 ↔ Heading 150 (ommitting the direction of turn)
- ☑ 단위를 생략가능 한 것은 생략해도 되나, 잘못된 단위를 쓰는 것은 감점

(2) 상황 / 지시 / 교신 및 질문을 구체적으로 정확하게 인지하고 있다는 근거가 명확하게 드러나는 답변이 바람직한 답변입니다.

[감점고려 사례 예시]

(a) 답변회피 상황 1)

- 관제사의 상황 대처에 대해서 조종사 관점에서 코멘트하라는 질문에 대해, “아주 잘 했다. 그냥 모든 걸 다 알맞게 했다. 나라도 그렇게 했을 것이다. 답변 끝”처럼, 상황을 구체적으로 이해하였다는 근거를 드러내지 못하고, 구체적 사실을 이해하지 못했다는 것을 들이지 않기 위해서 직접적 언급을 회피하는 답변, 혹은 한 가지 답변을 암기하여 여러 가지 질문에 대비하기 위해 전략적으로 일반화시킨 답변 등은 모두 감점 사유가 됩니다.

(b) 답변회피 상황 2)

- “Say again I don’t understand you.”처럼 문제에 대한 대답 대신 문제 자체를 못들었다고만 하는 경우, 상황에 대한 언급이 전혀 없는 답변에 대해서는 감점 사유가 됩니다.

(c) 답변회피 상황 3)

- “Confirm taxi via alpha, then bravo?”처럼 관련 내용을 구체적으로 언급하면서 못 알아들은 일부분에 대하여 확인하는 질문은, 그 정도와 경우에 따라서 4등급에 해당하는 점수를 받을 수 있습니다. 아울러, 관련 내용을 빠짐 없이 전부 다 복창하면서 위와 같이 confirm 요청을 했다면 5등급도 가능합니다.

(d) 답변회피 상황 4)

- “I have never experienced, so I don’t know how to handle this situation”과 같이, 아직 학생이라서, 아직 운항해본 적이 없어서 등 경험이 없어서 모르겠다고 하는 경우에도, 질문과 관련된 구체적인 상황을 언급하면서 그에 대한 경험이 없다고 해야 올바른 대답으로 인정됩니다.

2. 어휘, 문법 관련

(1) 필수 단어를 정확하게 사용하십시오.

- ① 과제 해결에 필수적인 단어는 반드시 포함시키고,
- ② 불필요하고, 오해의 소지가 있는 단어는 사용을 삼가하십시오.
- ③ 교신 중에는 표준어법의 용어 사용이 일반영어 어휘보다 우선시됩니다.

[감점고려 사례 예시]

(a) 엔진 손상을 표현하기 위해서 engine “damaged” 대신에 “injured”, “sick” 라고 하는 경우 등 어휘 선택이 부적합 또는 부정확한 경우:

- 어휘영역에서 조금 어색하더라도 무리 없이 이해가 가능하면 4등급, 의미를 왜곡시킬 소지가 있다면 3점 이하의 점수를 받게 됩니다.

(b) 교신 상황에서, 표준어법이 있는 경우 표준방식의 교신이 훨씬 효율적이고 명확합니다. 교신상황에서의 일반영어 사용은 인지하지 못하는 문법적 오류 발생가능성이 훨씬 큼니다.

예를 들어, I wanna, we would like to, I need to 보다는 “request ~”로 요청 사항을 전달해야 합니다.

→ (응시자 표현) There is a CB area in front of us, we want to deviate 10 mile left side of the track. → (권장 표현) Request offset 10 mile left of the track due to CB (or to avoid CB).

→ (응시자 표현) we (문법오류) encountering heavy turbulence because of that, we needed(<-문법오류) to climb to FL330. → (권장 표현) Request climb to FL330 due to turbulence.

(2) 문법 오류가 “조금” 있어도, 의미 왜곡이 없으면 운항가능 등급(4)을 받을 수 있습니다.

① 문장에 문법 오류가 있더라도, 이해는 가능한 경우, 반복적이지 않은 일회성 실수

- we ARE have a declare emergency , we ARE call ~, we ARE have a ~
- we MAKING go around due to localizer signal fluctuation.

② 교신어법을 제외하고는, 완결된 문장으로 답변해 주십시오. 비록 어휘만 가지고 의미 짐작이 가능하더라도, 조각난 문장(fragmentary structure)은 감점 대상입니다.

- The unruly passenger restrained a flight attendant hurt and injured.

[감점고려 사례 예시]

(a) 습관적 남용: a, an, the, -s등을 부적절하게 반복적으로 사용하는 경우, 그 결과 의미상 왜곡 소지가 발생하거나 이해를 방해한다고 판단되면 감점.

- We approaches finals / Request taxi to the terminals
- We'll the report the when the established on the localizer.

(b) 습관적 생략: 의미상 꼭 필요한 어휘인데도 습관적으로 생략하는 경우, 그 결과 의미상 왜곡 소지가 발생하거나 이해를 방해한다고 판단되면 감점.

- We (are) leaving 14000 (for) FL310.
- Hold (on) taxiway Delta.
- Hold short (of) runway 23.
- Request (ILS) runway 34. - Cleared (visual) approach

(3) 지나간 상황, 과거에 있었던 일, 본인의 경험 등 필수적으로 과거 시제가 필요한 답변의 경우, 특히 Part 2 Task A의 마지막 질문과 Task C의 경우에는 과거 시제의 적절한 사용이 필수적으로 요구됩니다.

(4) ICAO 기준에 의하여 5등급을 받기 위하여 complex structure를 사용할 수 있어야 하며, 확장적인 어휘 사용 능력 여부가 증명되어야 합니다.

※ Complex structure란 ICAO 9835 Appendix B에 기술되어 있습니다 .

3. 표준 어법과 발음 관련

(1) 표준 어법은 ICAO 규정에 근거합니다.

- ① “교신” 중에는 교신의 표준용어 및 어법 적용이 일반영어보다 우선시됩니다.
 (“교신”은 언어의 유창성과 복잡성 보다는 간단, 명료하고 직접적인 의사표현이 중요)

[비권장 답안 예시]

(a) Request 미사용:

- We need to climb now
- We want to taxi to the terminal
- We would like to divert to the nearest airport.
- Can we go to runway 34?

(b) Affirmative / Negative / Unable (to) 미사용:

- Roger, field in sight.: Roger과 Affirm은 의미가 다릅니다.
- No, request ILS runway 23, I say again, runway 23: No는 Negative라고 해야 합니다.
- We cannot continue taxi.: 수행이 불가능함은 Unable (to)로 표현해야 합니다.

(c) P1TB 응답시 : 상황이해 선행. 이해된 상황을 바탕으로 가장 적합한 답변을 해야 합니다.

A. 할수 있느냐 없느냐, 지시에 대한 불가능 표시 등의 문제에 있어서는

“ Confirm/Verify + instruction 및 clearance, information, + (필요시) 추가 설명 및 요구

“ Unable/ Negative, (instruction/clearance ~), due to (reason), Request (alternative intention) or able ~” 같은 형식이 바람직한 답변 방식

“ Confirm~? ” 에 대한 답이 긍정일 경우 “Affirm~ 이 바람직하며, Yes, OK, Roger는 해당사항의 적절한 답이 아닐 수 있습니다.

(2) ICAO 규정에 따른 발음을 권장합니다.

※ 아무리 쉬운 것이라도, ICAO 9432 및 국토부 무선통신 매뉴얼(고시 제2018-682호) 문서를 꼭 한 번 확인해 보시길 권장 드립니다.

- ① 발음이 어색해도 의미 전달이 가능하다고 판단되면, 운항가능 등급입니다.

[예시]

(a) 잘못된 발음이지만 운항가능등급(level 4)으로 판단

- Turn right heading 150에서 “right” 발음이 light로 들렸지만, 문맥상 의미 전달 가능.
- Cleared RNAV 발음이 약간 이상했지만, 의미 전달 가능.
- 내용상은 완벽한 리드백인데, 숫자 발음에서 3 (tree 대신 three발음) 과 5(fife 대신 five로 발음) 발음이 비표준임.

- ② 발음이 이상해서 해당 부분이 다르게 이해될 가능성이 있다고 판단되면, 4등급 이하로 감점될 수 있으니, 주의하시기 바랍니다.

- (a) 40 mile은 fo-wer zero라고 하면 되는데, forty라고 하다 발음이 fourteen처럼 들린다면 가 하면 감점의 대상이 될 수 있습니다. 20 two-zero 하시며 쉬운데, twenteen으로 발음하시는 경우가 있습니다. (twelve? twenty?)
- (b) 문장에서 can 과 can't는 의미가 완전히 다르지만, 분명하게 발음하여 구분을 주기 어렵습니다. 제 3자가 듣기에 의도를 오해할 가능성이 큼니다. “unable”이란 명확한 단어가 있습니다.
- (c) windshield를 wind shear로 발음하거나, TCAS RA[TEE-CAS AR-AY]를 [티키스 알이]같이 발음하시어 중요한 상황에 의사전달이 되지 않는 상황이면 감점됩니다.
- (d) request는 항공분야에서 통상 사용되기 때문에 발음으로 인한 오해의 소지가 적습니다만, 교신중 request 대신 require 등의 단어를 사용하면서 발음을 틀리시면 타국의 관제사 및 조종사는 que[쿠우에] 발음이 정확하지 못한 경우 이해도가 낮아지는 것을 고려하시길 바랍니다.

(3) 다시 한 번, ICAO 규정을 확인해 보시고 본인의 어법과 발음이 ICAO 표준을 따르고 있는지 반드시 진단해 보시길 권합니다.

- ① 원어민 발음이 아니어도 발음이 아니어도 됩니다. Roger가 Lager, light가 right으로, pilot이 filot으로, flight이 plight으로 발음되어도 문맥을 정확하게 전달하여 의미상의 혼동이 없다면 불합격 점수를 드리지는 않습니다. 다만, “affirmative”를 “어피르마팁”이라고 하시는 정도면 좀 곤란합니다. 여러분께서는 국제 비행을 하셔야하기 때문에 국제 비행시 의사소통 가능한 발음을 연습하시길 부탁드립니다.
- ② 충분히 안다고 생각하시는 것, 동료들도 전부 그렇게 쓰고 있다는 것, 다시 한 번 ICAO 규정에 맞추어 보시길 당부 드립니다. ICAO의 규정상 Altimeter 43.21에서는 decimal이 필요 없으며, SID의 발음은 “에스아이디”가 아니라 “씨드”입니다. 해당 사안들은 교신의 효율성과 정확성을 위한 것으로 꼭 한 번 더 확인 당부 드립니다.
- ③ request는 항공분야에서 통상 사용되기 때문에 발음으로 인한 오해의 소지가 적습니다만, 교신 중 request 대신 require 등의 단어를 사용하면서 발음을 틀리시면 문법이 정확하지 않은 경우 타국의 관제사 및 조종사는 que[쿠우에] 발음이 정확하지 못한 경우 문맥에 대한 이해도가 심각하게 낮아지는 것을 기억해두시길 바랍니다. 표준관제 용어는 발음 문제에 있어서도 non-native 간의 의사소통의 성공률을 높여주는 역할을 합니다. 항공분야의 상대는 한국인 조종사 및 관제사가 아닐 가능성이 아주 큼니다.

(4) 비상선언에 대한 용어는 반드시 “MAYDAY, MAYDAY, MAYDAY” ,혹은 “PAN PAN, PAN PAN, PAN PAN”

훈련되어 있지 않은 경우 실제 비상상황에서 용어를 사용하지 못하는 경우가 많습니다.

비상상황을 선언하라고 말하는 경우 “we are declaring emergency”로 의사소통은 가능하지만, 급한 상황에서 non-native의 declaring emergency는 상대 관제사의 confirm을 유발하여 불필요한 교신을 추가 반복하게 되는 것으로 조사되었습니다. 한국인의 “declare”, “emergency” 발음을 타국의 관제사가 한 번에 알아 듣지 못하는 경우도 있을 수 있습니다. 세계 모든 국가가 공통으로 비상/위기 상황을 가장 명확하고 신속하게 전달하여 즉각적인 조력을 요청하고 또

수신자는 필요한 조력을 지체없이 제공하고자 지정된 용어가 “MAYDAY”, “PAN PAN”입니다.
시험상황도 하나의 실무 훈련상황의 일환이라 생각하시고 적절한 용어 사용 바랍니다.

(유사 응답) We are declaring emergency! / declare emergency!

Request priority!!(비상 선언없이)

Emergency! Emergency! Emergency!

4. 상호작용과 유창성 관련

(1) 문제가 요구하는 바를 직접적으로 표현하십시오.

- ① 핵심을 찌르지 못하고 에둘러 표현하거나, 듣는 사람이 아주 많은 노력을 해야 말하는 사람의 의도가 짐작된다면, 효율적이지 못한 대답으로 간주됩니다.

※ We encounter severe turbulence. because of that, I would like to climb to flight level 150, if there is no traffic. So, request climb to FL150.

→ Request climb to FL150 due to turbulence.

(원하는 것을 먼저 명료하게 밝히고(simple, clear, concise, direct), 사유를 나중에 반드시 덧붙임)

- ② 상황에 대한 부정적인 답변시(unable/ negative)

관제사 지시에 대한 부정적 응답시

Unable/negative (해당 사항) + due to (이유/performance...)

+ request (가능한 사항), alternative intention

(예) ATC : HL123, maintain speed 290 or greater until advice

Pilot : Unable maintain speed 290 knots or greater, due to turbulence,

Request speed 270 or less/Our maximum turbulence penetration speed is 270 knots

(2) 문제가 요구하는 바를 빠짐없이 답변에 포함시키십시오.

- ① 두 가지 이상의 요구가 포함되는 경우, 모든 내용을 답변에 포함시켜야 합니다.
- 관제사의 지시를 “복창(read-back)”하고, 필요한 사항을 “요청(request)”하고 어떤 사항에 대하여 물어봐라(Inquire) : 리드백만 하고 요청사항 및 정보에 관한 질문을 누락시켜서는 안 됩니다.
 - 어떤 일이 있었는지 정리해서 말한 다음, 이런 상황에 대한 본인의 훈련 경험을 이야기하라: 상황 정리만 하고, “경험” 이야기를 빠뜨리면 안 됩니다.
 - 적절한 조치가 취해졌는지 본인의 의견을 피력하라 (Part 2 Task C 질문의 경우에): 어떠한 일이 있었는지 정리만 해서는 질문이 충족되지 않습니다. 조치의 적절성에 대한 본인의 판단과 그 판단의 근거가 답변 중에 드러나야 합니다.

(3) 문제가 요구하는 바와 관계없는 “군더더기”가 아니라면, 길게 말하다 시간을 초과하는 것은 괜찮습니다.

- 다만, 문제가 원하는 내용이 전부 들어있는 상태여야 합니다.
 - 반대로, 지나치게 짧은 대답으로 충분한 의미 전달이 안 된 경우 감점 대상이 될 수 있습니다. (참고)언어학적으로는 의견을 구성하기 위한 최소단위의 문장은 5문장 정도 된다고 합니다.
 - 이미 했던 말을 자꾸만 반복 하거나, 질문 내용과 관계없는 내용으로 시간만 채우는 경우는 감점대상입니다.
 - (주의) “교신”중에 영어를 잘하는 것을 보여주기 위하여 길게 말씀하실 경우, 장황하고해당사안이 오히려 명료한 의사소통에 오히려 방해한다고 판단되면 아무리 유창한 영어를 사용한다고 하여도 5등급으로 평가되지 않을 수 있습니다.
- ※ 교신의 원칙을 준수하려 하지 않는다면 원어민도 4등급이 나올 수 있습니다.

5. 기타 습관 및 실수 관련

(1) 교신 중에 했던 말을 정정할 필요가 있을 때는 반드시 “correction!”이라고 하신 후에 정정해주시요.

(2) 부주의에 의한 반복적인 콜사인 실수는 감점대상이 됩니다.

(3) 유창성과 관련된 습관(말버릇) 유형

※ Providing options on alternative airports was more than adequate and suitable.

위 문장 “대체 공항에 대한 옵션을 제공한 것은 매우 알맞고 적절 했습니다”를 말할 때:

① 긴 침묵(long pausing / silence):

Providing options on (쉼~~~~)// alternative airports was (쉼~~~~)// more than adequate and suitable. 아버지 가방에 들어가신다와 같이 들릴 수 있습니다.

② 부적절한 멈칫거림(improper pausing with hesitation):

Providing options / on / alternative airports was / more than / adequate / and suitable.

③ 말더듬(stammering):

P, P, Pro, Providing o. o. options on alt- alter- alternative airports was mo, mo, mo, more than adequate an, an, and suitable.

④ 무의미한 삽입어(filler):

Uh- Providing ah- options um- on alternative airports uh- was uh- more than ah- adequate and um- um- suitable.

⑤ 교신시 응대는 5초 이내에 이루어져야 합니다.

<div data-bbox="180 443 451 488" data-label="Image"> </div> <div data-bbox="180 712 440 763" data-label="Text"> <p>국토교통부 MINISTRY OF LAND, INFRASTRUCTURE and TRANSPORT REPUBLIC OF KOREA</p> </div> <div data-bbox="167 848 528 1012" data-label="List-Group"> <ul style="list-style-type: none"> ● 국내규정으로 무선통신관련 내용들을 들어있습니다. 꼭 한번 참고하여 학습하시길 바랍니다. </div>	<div data-bbox="545 271 1406 306" data-label="Text"> <p>http://www.molit.go.kr/USR/I0204/m_45/dtl.jsp?idx=15744</p> </div> <div data-bbox="545 362 1142 398" data-label="Text"> <p>국토교통부 고시 제 2018-682호 무선통신매뉴얼</p> </div> <div data-bbox="608 407 1500 1160" data-label="List-Group"> <ul style="list-style-type: none"> Chapter 1. Glossary Chapter 2. General Operating Procedures Chapter 3. General Phraseology Chapter 4. Aerodrome Control: Aircraft Chapter 5. Aerodrome Control: Vehicles Chapter 6. General Radar Phraseology Chapter 7. Approach Control Chapter 8. Area Control Chapter 9. Distress and Urgency Procedures and Communications Failure Procedures Chapter 10. Transmission of Meteorological and Other Aerodrome Information Chapter 11. Miscellaneous Flight Handling Chapter 12. Executive Work </div>
<div data-bbox="175 1240 255 1270" data-label="Image"> </div> <div data-bbox="210 1305 446 1397" data-label="Text"> <p>Doc 4444 PROCESSED FOR AIR NAVIGATION SERVICES Air Traffic Management Sixteenth Edition, 2016</p> </div>	<div data-bbox="545 1184 1391 1223" data-label="Section-Header"> <h2>ICAO DOC 4444. PANS ATM / CHAPTER 12. Phraseologies</h2> </div> <div data-bbox="608 1234 1382 1570" data-label="List-Group"> <ul style="list-style-type: none"> 12.1 Communications procedures 12.2 General 12.3 ATC phraseologies 12.4 ATS surveillance service phraseologies 12.5 Automatic dependent surveillance — contract (ADS-C) phraseologies 12.6 Alerting phraseologies 12.7 Ground crew/flight crew phraseologies </div>
<div data-bbox="169 1648 510 1975" data-label="Image"> </div>	<div data-bbox="557 1794 777 1827" data-label="Text"> <p>ICAO DOC 9432</p> </div>

출처 : 유로컨트롤 <https://www.skybrary.aero/bookshelf/books/115.pdf>

** 해당 내용은 참고자료이며 해당내용을 평가에 직접적으로 적용하는 것은 아님을 알려드립니다.

ALL CLEAR?



ICAO Standard Phraseology

A Quick Reference Guide for Commercial Air Transport Pilots

Communication error is the biggest causal factor in both level busts and runway incursions in Europe. This document aims to provide Commercial Air Transport (CAT) pilots and other pilots flying IFR within controlled airspace with a quick reference guide to commonly used radiotelephony (RTF) phrases that may be encountered during a routine CAT flight in European Airspace.

Introduction

Communication error is the biggest causal factor in both level busts and runway incursions in Europe. This document aims to provide Commercial Air Transport (CAT) pilots and other pilots flying IFR within controlled airspace with a quick reference guide to commonly used radiotelephony (RTF) phrases that may be encountered during a routine CAT flight in European Airspace. It also explains some of the rationale behind the use of certain words and phrases to aid understanding and reinforce the need for compliance with standard phraseology.

The goal is to improve safety by raising RTF standards.

The need for clear and unambiguous communication between pilots and Air Traffic Control (ATC) is vital in assisting the safe and expeditious operation of aircraft. It is important, therefore, that due regard is given to the use of standard words and phrases and that all involved ensure that they maintain the highest professional standards when using RTF. This is especially important when operating within busy sectors with congested frequencies where any time wasted with verbosity and non-standard, ambiguous phrases could lead to flight safety incidents.

Phraseology has evolved over time and has been carefully developed to provide maximum clarity and brevity in communications while ensuring that phrases are unambiguous. However, while standard phraseology is available to cover most routine situations, not every conceivable scenario will be catered for and RTF users should be prepared to use plain language when necessary following the principle of keeping phrases clear and concise.

Contents

1. Clearance and Taxi
2. Take-off and Departure
3. Read-back
4. Climb, Cruise and Descent
5. Approach and Landing
6. Emergency Communications

Note:

This document uses RTF examples showing both pilot (denoted by *blue italic text*) and ATCO (denoted by *grey text*) communication. For example:

Pilot - Metro Ground, Big Jet 345, request taxi

ATC - Big Jet 345, Metro Ground, taxi to holding point A1, hold short of Runway 18

Taxiing – A Safety Critical Activity

RTF is crucial to the safety of the flight during taxiing. Any mistake that causes the aircraft to enter a runway in error could be catastrophic.

Taxi Clearance Limit

All taxi clearances will contain a clearance limit, which is the point at which the aircraft must stop unless further permission to proceed is given.

Noting Down Taxi Clearances

Complex or lengthy taxi clearances should be noted down by crews.

RTF Taxi Instructions to Departure Runway

Metro Ground, Big Jet 345, request taxi

Big Jet 345, Metro Ground, taxi to holding point C, runway 27

Taxi to holding point C, runway 27, Big Jet 345

Big Jet 345, contact Metro Tower 119.2

Contact Metro Tower 119.2, Big Jet 345

Crossing an Intermediate Runway

If a taxi route involves crossing a runway, whether active or not, specific clearance to cross that runway is required.

Departure Delay Information

Departure sequence information such as 'number 5 to depart' or 'expect departure in ...' is NOT a take-off clearance.

RTF Taxiing Across an Intermediate Runway

Metro Ground, Big Jet 345, request taxi

Big Jet 345, Metro Ground, taxi to holding point A1 runway 18

Taxi to holding point A1 runway 18, Big Jet 345

When traffic permits

Big Jet 345 cross runway 18 at A1, taxi to holding point C, runway 27

Cross runway 18 at A1, taxi to holding point C, runway 27, Big Jet 345

NB: ATC may request Big Jet to confirm when Runway 18 is vacated

A Conditional Taxi Clearance

Conditional clearances may expedite traffic flow, but there are risks. Read-back must be in full and in the same sequence as given. A taxi clearance, shown below, allows taxi after another action has first taken place ie. the condition of the clearance. Where there may be ambiguity as to the subject of the condition, additional details such as livery and/or colour are given to aid identification.

A conditional taxi clearance allows the aircraft to taxi only **after** another action has taken place. The structure and order of conditional clearances is essential to their safe execution.

Correct read-back of a conditional clearance is vital.

Metro Delivery, Big Jet 345, Stand Bravo 1, Boeing 737 with information Q, QNH1006, request clearance

Big Jet 345, Metro Delivery, Cleared to Smallville, T1A departure, Squawk 3456, slot time 1905

Cleared to Smallville, T1A, Squawk 3456, Big Jet 345

Big Jet 345, request start up

Big Jet 345, start up approved, contact Metro Ground 118.750 for taxi instructions

Start up approved, contact Metro Ground 118.750 for taxi instructions, Big Jet 345

Metro Ground, Big Jet 345 Stand B1, request taxi

Big Jet 345, Metro Ground, after the red and white Antonov with the purple fin, taxi to holding point runway 08

After the red and white Antonov with the purple fin, taxi to holding point runway 08, Big Jet 345

*ICAO:

In all cases a conditional clearance shall be given in the following order and consist of:

1. Identification;
2. The condition
3. The clearance; and
4. Brief reiteration of the condition

Conditional clearance to cross the intermediate runway:

Conditional phrases, such as “**behind** landing aircraft” or “**after** departing aircraft”, shall not be used for movements affecting the active runway(s), except when the aircraft or vehicles concerned are seen by the appropriate controller *and* pilot. The aircraft or vehicle causing the condition in the clearance issued shall be the first aircraft/vehicle to pass in front of the other aircraft concerned.

NB: Beware - the ICAO phrase ‘**behind**’ has been misinterpreted as an instruction to ‘get close to’ the preceding aircraft, leading to serious jet blast incidents.

Big Jet 345, after landing Airbus 321, cross Runway 09 at C2, after
After landing Airbus 321, cross Runway 09 at C2 after, Big Jet 345

Then:

Big Jet 345, taxi to holding point C1, runway 27
Taxi to holding point C1, runway 27, Big Jet 345

Then:

Big Jet 345, contact Metro Tower 123.625
Contact Metro Tower 123.625, Big Jet 345

TAKE OFF AND DEPARTURE

'Take-off' shall only be used when issuing a clearance to take-off.

- Do not use phrases such as 'prior to take-off' or 'after take-off'.
- If the controller uses 'after departure' or 'follow', this is NOT a clearance to take-off.

Any instructions to HOLD, HOLD POSITION or HOLD SHORT OF, shall be read back in full using the appropriate phrase – *HOLDING* or *HOLD SHORT OF*.

In the airport environment, the word '**cleared**' shall only be used in connection with a clearance to take-off or land. To aid clarity, a take-off clearance will always be issued separately.

RTF Take-off Clearance

Metro Tower, Big Jet 345, approaching holding point C1

Big Jet 345, Metro Tower, line up runway 27

Lining up runway 27, Big Jet 345

Big Jet 345, runway 27, cleared for take-off

Cleared for take-off, Big Jet 345

Once airborne:

Big Jet 345, contact Metro Radar 124.6

Contact Metro Radar on 124.6, Big Jet 345

Amendment to Departure Clearance

Amendments to departure clearances are known to contribute to runway incursion incidents.

The phraseology for amendments to departure clearances where the aircraft is approaching the runway will begin with '**hold position**'.

RTF Amendment to Departure Clearance

Metro Tower, Big Jet 345, approaching holding point C1

Big Jet 345, Metro Tower, hold at C1

Hold at C1, Big Jet 345

Big Jet 345, hold position, amendment to clearance, T3F departure, climb to 6000 feet

Holding, T3F departure, climb to 6000 feet, Big Jet 345

Or:

Big Jet 345 hold position, after departure climb to altitude 6000 feet

Holding, after departure climb to 6000 feet, Big Jet 345

Conditional Line-Up Clearance

Important points involving the active runway:

- The condition is always given directly after the call-sign and before the clearance.
- Conditional clearances must be read back in full and in exactly the same sequence as given plus a brief reiteration of the condition.
- The aircraft or vehicle that is the subject of the condition must be visible to the flight crew and the controller.
- The subject aircraft or vehicle of the condition shall be the next aircraft/vehicle to pass.
- The condition must relate to only one movement.
- Always clarify if unsure.

RTF A Conditional Line Up Clearance

Metro Tower, Big Jet 345, approaching holding point C1

Big Jet 345, Metro Tower, hold at C1

Hold at C1, Big Jet 345

Conditional line up clearance:

Big Jet 345, behind landing Boeing 757, line up runway 27, behind

Behind landing Boeing 757, line up runway 27, behind, Big Jet 345

Cancelling Take-off Clearance

If take-off clearance has to be cancelled before the take-off roll has commenced, the flight crew shall be instructed to hold position, stating reason.

If it is necessary to cancel take-off clearance after the aircraft has commenced the take-off roll, the flight crew shall be instructed to stop immediately.

RTF Cancelling Take-off Clearance

Aircraft has not commenced take-off roll:

Big Jet 345 hold position, Cancel take-off, I say again cancel take-off due to vehicle on the runway

Holding, Big Jet 345

Aircraft has commenced take-off roll:

Big Jet 345 stop immediately, (Big Jet 345 stop immediately)!

Stopping, Big Jet 345

READ-BACK

Read-back is vital for ensuring mutual understanding between the pilot and the controller of the intended plan for that aircraft.

- Following correct read-back the flight crew must ensure that they carry out the correct action. Statistics show that one of the most common causes of a level bust in Europe is correct read-back followed by **incorrect** action.
- Strategies to prevent the above error include noting down the clearance prior to read-back and ensuring that both flight crew members listen to all clearances, including taxi clearance. **If in doubt check!**

Any safety related message or part of message transmitted by voice must always be read-back.

The Following Shall Always Be Read Back

- Taxi instructions
- Level instructions
- Heading instructions
- Speed instructions
- Airways/route clearances
- Approach clearances
- Runway in use
- All clearances affecting any runway
- SSR operating instructions
- Altimeter settings
- VDF information
- Type of radar service
- Transition levels

Frequency changes should always be read-back in full.

Checking the accuracy of a read-back is far easier if the information is read back in the same order as given. Omissions are more difficult to pick up than incorrect data.

- **When a read-back is required ensure it is complete and in the order given.**
- **Always listen for (and check) ATC confirmation or correction of read-back.**

CLIMB, CRUISE AND DESCENT

Initial Calls

Studies show that an initial call which does not contain all the required information can lead to a loss of separation. On first contact after departure include:

- **Call-sign**
- **SID**
- **Current or passing level plus cleared level**

The information in the initial call is essential for the safety of the aircraft by ensuring mutual understanding between the crew and the controller of the intention for the aircraft.

Omissions will require an additional call for clarification which may lead to frequency congestion.

On first contact with subsequent frequencies include **call-sign (and wake turbulence category if 'heavy')** and:

- **Level** , including passing and cleared level if not maintaining the cleared level
- **Cleared level** (if different from **current level**)
- **Speed** (if assigned by ATC), and
- **Other ATC** clearances assigned.

RTF Initial Call

Big Jet 345, runway 27, cleared for take-off

Cleared for take-off, runway 27 Big Jet 345

Once airborne:

Big Jet 345, contact Metro Radar 124.6

Contact Metro Radar 124.6, Big Jet 345

Initial call to radar:

Metro Radar, Big Jet 345, T3F, passing 2300 feet climbing to 6000 feet,

Big Jet 345, Metro Radar, radar contact

Degrees

Headings ending in zero can easily be confused with flight levels (this confusion can be avoided by appending the word '**degrees**', however this is not an ICAO requirement or recommendation).

Flight Levels

Flight levels below FL100 are referred to as two digit numbers e.g. Climb flight level eight zero to reduce the risk of confusion with a heading instruction eg. heading zero eight zero.

Flight levels 100, 200 and 300 are often confused for 110, 210 and 310: special care should be taken when enunciating '**zero zero**'.

En-Route RTF

RTF En-Route Examples

Big Jet 345, fly heading 260 (degrees), climb to FL 100, no speed restrictions

Fly heading 260 (degrees), climb to FL 100, no speed restrictions, Big Jet 345

Big Jet 345, fly direct BONNY, climb to FL 360

Direct BONNY, climb to FL 360, Big Jet 345

Big Jet 345, contact Northern Control, 132.6

Contact Northern Control, 132.6, Big Jet 345

Northern Control, Big Jet 345, passing FL240 climbing to FL 360, direct BONNY

Big Jet 345, Northern Control, fly direct CLYDE

Direct CLYDE, Big Jet 345

Reduced Vertical Separation Minima

- Flight crew shall report RVSM approved status with 'Affirm RVSM' and report RVSM non-approved with 'Negative RVSM' followed by reason.
- Flight crew denying ATC clearance into RVSM shall state 'Unable RVSM' followed by the reason, for example 'Unable RVSM due turbulence' or '**Unable RVSM** due equipment'.
- Flight crew able to resume RVSM shall use the phrase 'Ready to resume RVSM'.
- ATC should be informed when a non-RVSM approved State aircraft is requesting climb into RVSM airspace thus '...Request FL320, Negative RVSM'.

If able, ATC will give the clearance as follows '...Climb to FL 320, Negative RVSM'. Notice that the term 'Negative RVSM' is used in the clearance and the read-back, thus 'Climb to FL 320, Negative RVSM...'. Otherwise ATC will state that they are unable to issue the clearance into RVSM airspace.

RTF for TCAS

Once an aircraft departs from its ATC clearance or instruction in compliance with an RA, or a pilot reports an RA, the controller ceases to be responsible for providing separation between that aircraft and any other aircraft affected as a direct consequence of the manoeuvre induced by the RA.

If an RA is causing departure from the ATC clearance

(Callsign) TCAS RA (pronounced "TEE-CAS-AR-AY").

When returning to assigned clearance

(Callsign) CLEAR OF CONFLICT, RETURNING TO (assigned clearance).

When the assigned ATC clearance has been resumed

(Callsign) CLEAR OF CONFLICT (assigned clearance) RESUMED

When an ATC clearance contradictory to the ACAS RA is received, the flight crew will follow the RA and inform ATC directly

(Callsign) UNABLE, TCAS RA.

Conditional Clearances

Conditional clearances can be issued eg. in the TMA. 'After passing altitude 4000 feet, fly heading...' These must be treated with great care and read back in **exactly** the same format in which they are given. **If in doubt – check!** Writing down such clearances should help in preventing a conditional clearance being neglected.

Avoiding Action

Lateral Avoiding Action

Big Jet 345, turn left (or right) immediately heading 270 (or 30 degrees)! to avoid traffic at 2 o'clock, 5 miles crossing right to left, 500 feet below

Vertical Avoiding Action

Big Jet 345, climb (or descend) immediately to FL 160, traffic at 12 o'clock 3 miles opposite direction, same level

An urgent tone shall be used

RTF for VHF frequencies – Use of Six Digits

Use six digits except where the final two digits of the frequency are both zero, in which case only the first four digits need to be transmitted.

Simultaneous or Continuous Transmissions

Direct controller – pilot communication can be adversely affected by simultaneous or continuous transmissions. There are times when the controller is not aware of a blocked transmission, but a pilot is. On hearing a simultaneous transmission it can be helpful if a pilot informs ATC that the transmission was BLOCKED.

Transmission blocked, Big Jet 345

To and For

Use of the word '**to**' directly before a climb/descent instruction or change of heading can be confused as '**two**'. Such confusion is avoided by using the mandatory words '**flight level**' or '**heading**' immediately before the numbers.

Big Jet 345, climb to FL180.

Big Jet 345, turn left to heading 310 degrees.

There are also occasions where inappropriate use of the word '**for**' can introduce confusion if it is interpreted as the number '**four**'.

Wake Vortex Separation Requests

Do not ask for *reduced* vortex wake separation; controllers do not have discretion to grant this.

APPROACH AND LANDING

Pilot-interpreted Approaches (eg ILS) Phraseology

The phrase '**cleared ILS approach runway xx**' has, in the past, introduced some ambiguity whereby pilots have taken this to mean they are cleared to the altitude/height depicted on the approach chart immediately prior to the final approach fix. This should not be assumed; normally clearances to descend at this point will be given distinctly.

Other phrases that are commonly in use include:

'Report established localiser (or ILS, GBAS/SBAS/MLS approach course).'

'Maintain (altitude) until intercepting glide-path.'

'Report established on glide-path.'

RTF Radar Vectors from the HOLD towards the ILS

Metro Approach, Big Jet 345, Boeing 737 with information P, Holding MAYFIELD descending FL 80

Big Jet 345, Metro Approach, now information Q, new QNH 998

QNH 998, Big Jet 345

Big Jet 345, leave MAYFIELD, heading 120 descend to 6000 feet, QNH 998, speed 210 knots

Heading 120, descend to 6000 feet, QNH 998, speed 210 knots, Big Jet 345

Big Jet 345, turn right heading 180, speed 180 knots, vectoring ILS runway 27 Right

Right heading 180, speed 180 knots, Big Jet 345

RTF –ILS continued:

Big Jet 345, turn right heading 240, descend to 3000 feet, report established localiser runway 27 Right

Right heading 240, descend to 3000 feet, report established localiser runway 27 Right, Big Jet 345

Big Jet 345, established localiser

Big Jet 345, cleared ILS approach runway 27 Right,

Cleared ILS approach runway 27 right, Big Jet 345

Or in busy RTF situations:

Big Jet 345, turn right heading 240 degrees, cleared ILS approach runway 27 Right, maintain 3000ft, until glide-path interception

Turning right heading 240, cleared ILS approach runway 27 Right, maintain 3000 ft until glide-path runway 27 right

Continue Approach

If the runway is obstructed when the aircraft reports '**final**', but it is expected to be available in good time for the aircraft to make a safe landing, the controller will delay landing clearance by issuing an instruction to 'continue approach'. The controller may explain why the landing clearance has been delayed. An instruction to '**continue**' is **NOT** a clearance to land.

RTF Continue Approach

Metro Tower, Big Jet 345, final runway 27 Right

Big Jet 345, continue approach

Continue approach, Big Jet 345

Big Jet 345, cleared to land, runway 27 Right, wind 270 degrees ten knots

Cleared to land runway 27 Right, Big Jet 345

The Go-Around

Instructions to carry out a missed approach may be given to avert an unsafe situation. When a missed approach is initiated cockpit workload is inevitably high.

- Any transmissions to aircraft going around shall be brief and kept to a minimum.
- In the event of a missed approach being initiated by the pilot, the phrase 'going around' should be used.

RTF the Go-Around

Controller Initiated:

Big Jet 345, go around

Going around, Big Jet 345

Pilot initiated:

Big Jet 345, going around

Roger (followed by suitable instruction)

EMERGENCY COMMUNICATIONS

RTF Emergency Communications

As soon as there is any doubt as to the safe conduct of a flight, immediately request assistance from ATC. Flight crews should declare the situation early; it can always be cancelled.

- A distress call (situation where the aircraft requires immediate assistance) is prefixed: ***MAYDAY, MAYDAY, MAYDAY.***
- An urgency message (situation not requiring immediate assistance) is prefixed:
PAN-PAN, PAN-PAN, PAN-PAN.
- Make the initial call on the frequency in use, but if that is not possible squawk 7700 and call on 121.5.
- The distress/urgency message shall contain (at least) the name of the station addressed, the call-sign, nature of the emergency, fuel endurance and persons on board; and any supporting information such as position, level, (descending), speed and heading, and pilot's intentions.

RTF Emergency Communications

MAYDAY, MAYDAY, MAYDAY, Metro Control, Big Jet 345, main electric failure, request immediate landing at Metro, position 35 miles north west of Metro, heading 120 flight level 80 descending, 150 persons on board, endurance three hours

Big Jet 345, Roger the MAYDAY, turn left heading 090, radar vectors ILS runway 27

Big Jet 345 request runway 09

Big Jet 345, roger, turn right heading 140 for radar vectoring runway 09, descend to 3000 feet, QNH 995, report established

Big Jet 345, heading 140, descend to 3000 feet QNH 995 , report established localiser runway 09

Fuel Reserves Approaching Minimum

'Fuel Emergency' or 'fuel priority' are not recognised terms. Flight crews short of fuel **must** declare a ***PAN or MAYDAY*** to be sure of being given the appropriate priority.

Radio Failure

Over recent years the number of reported radio failure incidents has increased considerably. With the heightened awareness in airborne security, ATC's inability to contact an aircraft experiencing a radio failure could lead to that aircraft's interception by military aircraft.

Pilots should familiarise themselves with loss of communications procedures and/or sleeping receiver procedures, including the use of 121.5 MHz.

Operators should ensure that ATC Units have readily available 24 hour contact details of company flight operations control.

출처: IATA

<https://www.iata.org/whatwedo/safety/runway-safety/Documents/Phraseology-Report-ed-1-2011.pdf>

의사소통 과정에 수반되는 많은 요소들 중에서 Standard Phraseology가 가장 중요한 것은 아마도 언어상의 차이에도 불구하고 빠르고 효과적으로 의사소통을 할 수 있게 하고 오해의 기회를 줄여주기 때문이다.

표준어법은 메시지가 오해될 위험을 줄이고 모든 오류를 신속하게 감지할 수 있도록 Read-back/hear-back 프로세스를 보조한다. 모호하거나 비표준적인 표현은 항공기 사고의 직접적인 원인이거나 발생에 절대적으로 기여하는 요인이다.

국제 용어 표준은 ICAO 부록 10 제2권 제5장 및 ICAO 문서 9432 - 무선통신 매뉴얼에 규정되어 있다. 또한 많은 국가 당국은 ICAO 조항을 구체화하는 무선전화 매뉴얼을 발행하고 있으며, 경우에 따라 지역 조건에 맞게 수정하기도 한다.

Non-standard phraseology 은 때때로 문제를 완화하기 위해 국가 또는 지역 항공 교통 서비스에 의해 일방적으로 채택되지만, 표준어법은 오해의 가능성을 최소화한다.

SID/STAR Phraseology

전용 SID/STAR Phraseology를 사용하면 항공 교통 관제사와 항공사가 길고 잠재적으로 복잡한 전송을 필요로 하는 상세한 허가 정보를 전달하고 이해할 수 있다. 시간이 지남에 따라, 이러한 장점은 각 국가가 제각기 편한 방식으로 사용하는 관행과 SID/STAR 용어의 일부 특정 요소에 추가되는 다른 의미들이 늘어나면서 희석되었다. 결과적으로, 항공 교통 관제사와 항공사가 SID/STAR 구문을 이해하는 사이에 불일치는 엄격하게 일치된 SID/STAR 구문을 채택하고 적용하기 위한 새로운 노력이 필요한 "안전 위험" 요소임으로 지적되고 있다.

Failure Effects

표준어법을 사용하지 않으면 오해, 의사소통의 불가능, 결국 안전 분리가 상실될 수 있다.

Related Accidents and Incidents

• C525 / B773, vicinity London City UK, 2009

On 27 July 2009, a Cessna 525 departing from London City failed to comply with the initial 3000 ft QNH SID Stop altitude and at 4000 ft QNH in day VMC came into close proximity on an almost reciprocal heading with a Boeing 777-300ER. Actual minimum separation was approximately 0.5nm laterally and estimated at between 100 ft and 200 ft vertically.

The investigation found that "Had the revised ICAO (SID R/T phraseology) procedures been adopted by the UK, it is likely that this incident would have been prevented because (the Cessna) would have leveled off at 3000 ft regardless of its cleared altitude."

• ***Vehicle / PAY4, Perth Western Australia, 2012***

Whilst a light aircraft was lined up for departure, a vehicle made an incorrect assumption about the nature of an ambiguously-phrased ATC TWR instruction and proceeded to enter the same runway. There was no actual risk of conflict since, although LVP were still in force after earlier fog, the TWR controller was able to see the vehicle incursion and therefore withhold the imminent take off clearance.

The subsequent Investigation noted that it was imperative that clearance read backs about which there is doubt are not made speculatively in the expectation that they will elicit confirmation or correction.

설문내용 정리

'조종사 또는 항공 교통 관제사가 오해나 오류를 일으키는 절차 또는 일반적인 관행이 있는가?': 응답자의 54%가 조종사나 조종사가 사용하는 절차 또는 일반적인 관행이 오해 및/또는 오류의 위협을 발생시켰음을 나타냄

조종사들은 더 많은 통찰력을 제공하기 위해 일상 업무에서 그들에게 위협으로 이어질 수 있는 구체적인 조건에 들어갈 수 있는 기회를 얻었다. 응답자의 응답은 주관적일 수밖에 없지만 이 보고서에 포함되기에 충분한 의미와 시사점을 가지고 있다.

다음은 특히 주파수가 혼잡하고, 소리가 약하거나, 잡음으로 인하여 혼동을 일으킨 경우 등은 조종사들이 보고한 가장 일반적인 악조건을 요약한 것이다.

- (1) 영어를 사용하는 국제 승무원들과 현지어를 사용하는 현지 승무원들은 조사 내내 가장 자주 언급되는 조건이었다. 조종사들은 이것이 상황 인식을 저해시키는 결과를 초래했다고 지적했다. 그들은 다른 승무원/관제사를 방해하지 않고 언제 통신을 시도해야 할지 결정하는데 어려움을 겪었다. 이 문제는 주파수 정체로 인해 복합적으로 발생했으며, 승무원들이 서로의 전송을 'stepping on'하게 되었을 수도 있다.
- (2) 의사소통 표준화 결여는 두 번째로 자주 언급되는 조건이었으며, 속어 사용, 공항 도표에 없는 지역 대기(holding) 구역의 사용, 음성 문자(예: "november" 대신 "Nectar")의 부적절한 사용, ICAO 표준 용어, 부적절한 콜사인의 사용 등이 포함되었다. 이런 문제는 미국을 비행하는 종사자들에게서 자주 발생하는 불만사항이다.

(3) 고도 참조의 경우, TO와 TWO, FOR와 FOUR의 사용은 고도 오류

(예: "cleared 2, 7,000"으로 이해되는 "cleared to 7000")의 잠재적 기여 요인으로 지적되었다.

"change one twenty five five": is that 120.55 or 125.5

(4) 전이 고도가 18,000인 경우, "cleared to ten thousand" 를 사용해 "cleared two-ten thousand". 로 해석할 수 있다. 따라서 고도를 사용할 때 "to"라는 단어를 사용하는 것은 매우 문제가 될 수 있다.

➤ 비행레벨(FL)이 사용되는 지역에서는, "TO"라는 단어와 함께 FL이 누락되어도 위험이 될 수 있다. (예: 정확한 간격이 "cleared to ten" 일 때 "cleared 210".으로 오인될 수 있다.

(5) 기수 변경의 경우, "Heading" 대신 "TO"를 사용하면 고도 변경 허가로 혼동을 일으킬 수 있다 (예: "heading zero five zero" 대신 "turn TO zero five zero" 이 climb/descend to flight level 050하는 허가로 오인될 수 있다).

(6) SID 및 STAR를 사용할 때 속도 및 고도 제한의 적용성에 대한 명확성이 결여됨.

(7) 호출부호 사용의 표준화 미비도 지적되었다. 파일럿이나 관제사가 불완전하거나 비표준 호출 부호를 사용하면 통신 오류와 오해의 위험이 증가할 수 있다.

- *Similar Flt numbers on different airlines*
- *Usage of native language with all domestic traffic*
- *In various USA airports, mostly JFK.... "clear to go" is a horrible example*
- *Misunderstanding of clearance onto an active runway. Threat of being on an active runway with traffic on short final.*
- *Large US airports, particularly those above (KORD, etc), controllers talk too fast, so you can't quite get all the clearance, but you don't want to ask for a readback because they are so busy. Area of most trouble is with ground control, then tower. It gets progressively better as you go to terminal, then center.*
- *Headings can be mistaken for levels and visa versa.*
- *Multiple call signs very similar*
- *Misunderstanding between taxi clearance and line up clearance. Misunderstanding leading to stay at initial level*
- *Misunderstanding, potential loss of separation*
- *Speaking fast with strong aggressive accent in a non std ICAO and speaking another language with local operator*
- *Non-standard phraseology, improve threat in control-transfers*

- *Is aircraft cleared to line up with preceding aircraft still holding at threshold*
- *Line up and wait / hold*
- *Specific SID crossing altitude deletions*
- *Line up clearance or rwy crossing clearance with rwy hold short red light illuminated. 2.- tight turns into ILS, increasing the chances of interfering into a parallel approach*

(8) 착륙과 이륙 단계는 상대적으로 단순하기 때문에 영향을 덜 받는 것으로 확인되었다. 오히려 다른 비행 단계에 대한 복잡한 허가가 더 자주 영향을 받았다. 단순화된 언어의 사용 방법을 찾는 것이 언어적인 불완전성에 의한 사고 유발 요소를 제거하는 방법임이 확인된다.

(9) 안전한 운항에 대한 책임과 절차의 안전한 실행은 항공 교통 관제사와 조종사 모두의 어깨에 달려 있다. 쌍방의 인내와 관심이 없으면 안전운항은 조화롭게 작용할 수 없고, 안전의 성취도 불가능하다. 비행 단계에서 ATC의 허가를 잘못 이해하면 조종사의 오해 및/또는 작동 오류가 발생할 수 있다.

(10) 이번 조사에서 조종사가 보고한 ATC 허가의 비표준 어법의 몇 가지 예는 다음과 같다.

- *Confusion over clearance - present position direct to, or cleared via filed flight plan routing*
- *Long clearances "hdg ...+ spd ...+ climb/descend to ...+ clear for ...+ change to frequency ..." very hard to remember all*
- *Can cause confusion as to whether a hdg or FL*
- *"Clear Direct Heading to XXX", which creates confusion whether ATC wants us to track DIRECT to XXX or maintain a specific HEADING. Another regular ATC CLEARANCE: "Climb To Five Thousand", which could easily be interpreted as "Climb TWO Five Thousand"!*
- *Pushback and taxi clearances using very confusing terms and gate hold procedures that amount to frustration and the occasional bout of rage among pilots, especially if they're from another area.*
- *If there is no arrival procedure, there is often a very confusing decent clearance. Example; "at 50 miles from xxx, descend to xxxx ft." Also, there are so many transitions on departures, it can be difficult to understand departure clearances due to English not being the mother language.*
- *When being cleared for take-off for an RNAV departure there are times when the phrase "clear for takeoff" creates confusion for some because most airports with Rnav departures use "clear for takeoff and state the Rnav departure" . I like to see all CLEARANCES to include the Rnav departure.*

- *When assigning a speed, sometimes we hear a CLEARANCE like this: "Reduce speed to two two zero knots". Perhaps it would be better to use "Reduce two two zero knots" or "Reduce to two twenty knots", since using "to (target)" can get confusing. Same thing happens with headings and altitudes with potentially dangerous outcomings.*

(11) 지상활주 중 ATC 허가에 관한 지적 내용은 다음과 같다.

- *ICAO procedures should push for all airports to provide clearances before pushing, to allow pilots time to study and discuss the clearance before operating the aircraft. Receiving clearances during taxi requires pilots to program their FMS's at that time, distracting them from their taxi operation.*
- *India, Sri Lanka and other countries where the route clearance is given during taxi out or just prior to reaching the departure runway.*
- *ATC clearance given to pilot while taxiing*
- *Taxi instructions whilst still at speed on landing roll. A repeated ATC clearance is always spoken faster than the first time whereas it should be slower*

(12) 지상활주는 비행 승무원의 완전한 주의가 필요한 업무 부하가 높은 비행 단계이다. 안전과 효율을 높이기 위해, 지상활주 중 비행 승무원의 작업량을 최소한으로 유지함으로써 위험과 위험에 대한 노출을 줄일 필요가 있다. ATC는, 가능하면, 항로 허가 등에 대해서는 가능하면 택시에 앞서 발부해 두어야 한다.

(13) '조종사나 항공 교통 관제사가 위협을 일으키는 절차나 일반적인 관행이 있는가? 자주 오해를 받는 현지 어구가 있는가?'

특히 지역에 익숙하지 않은 조종사에게 위협이 될 수 있는 조종사 또는 관제사가 사용하는 지역만의 특별한 절차나 일반적인 관행에 대한 위험성을 제기함

➤ **Non-standard phraseology:**

- *Use of phrase "down/up to 80" instead of "climb/descend flight level 80".*
- *USA: total lack of standardisation, eg "change one twenty five five": is that 120.55 or 125.5*
- *Variations on "line up and wait" Variations on altitude phraseology*
- *On the ground the ATC says « follow the traffic ahead of you » this created a runway incursion...*
- *Some ATC agencies in the MENA region will clear the flight from position "XXX YYY", meaning via the published/planned route, while other nearby agencies will use the same terminology to mean direct between the stated points.*

Cleared from XXX, YYY : direct? flight planed route

- The term "Shuttle Climb" is referenced in CYVR(펜쿠버) missed approach procedures. This is neither defined in Jepps nor understood by FAA
- Certified pilots. It is an ambiguous direction that is more often misidentified as a "Max Rate Climb" rather than a "climb at holding speed".
- ATC USA: Rwy full length available
- When given direct routing, we hear "fly to", "got to", "procede to". There should be only one wording: "direct to" (Boeing and Airbus use this on their FMS).

➤ **SID'S/STAR'S:**

- SIDs and STARs require airplane to comply with all altitude restrictions, either climbing or descending, unless the ATC specifically cancel the restrictions at a specific intersection, and when doing so, sometimes the ATC asks pilots why they are levelling instead of continue the climb or descent;
- Altitude restrictions in SID STAR
- High workload after airborne with a SID change and altitudes giving in meters
- There is no consensus whether altitude restrictions on SIDs and STARs are deleted or still applicable if assigned another altitude, i.e., certain countries this applies but in rest of world this does not. Lack of standard phraseology to indicate whether altitude restrictions are deleted or not;
- The inconsistent procedure for clearance to climb/descend on SID's and STAR's is a source of confusion and requires additional communication for clarification. This uses often scarce communication time;
- In country XXXXX crossing altitude restrictions still apply even when off route. You are still required to adhere to the restriction now passing abeam that position at the specified altitude. This only applies to country XXXX;
- When approaching on a STAR radar service clears you "Direct to a waypoint" sometimes they mean cancel the star and fly direct other times they mean fly the STAR and continue to that waypoint. I think the word Direct is not properly used.

➤ **Words/Number pronunciation:**

- The use of the words "TO" and "TWO", and "FOR" and "FOUR"
- It was recommended that the words "altitude" or "flight level" be used in all altitude/level change clearances.
- For example: "Airline XXX climb to altitude five thousand feet", rather than "Airline XXX climb to five thousand", which could be easily misunderstood as "Airline XXX climb two five thousand."
- Using words as TO, FROM etc... are supposed to be expelled from phraseology. This is why we have inbound XYZ, XYZ inbound, NEXT etc... in our "word base";

- ATC often uses the word TO (two?) when issuing descent or climb clearances;
- Use the word "To" on an Altitude clearance. Example "Clear to 3 thousand feet".
Am I clear 3000 feet or 23000 feet?
- Both ATC and pilots commonly use Climb/Descend TO a FL and omit to use Climb/Descend TO ALTITUDE xxxx THOUSAND FEET. Also the word 'DEGREES' is often omitted when assigned a heading of eg 240 (DEGREES)
- Descend to (two?) 2000 feet'. Why not say descend 'altitude 2000 feet'?
- Frequently used is for example Descent to(Two)three zero zero instead of descend FL300
- The word to and the number two quite often can lead to misunderstandings.
- My complaint is ATC not using "Flight Level" or "Altitude" before a climb or descent clearance and not using the word "Degrees" after a heading instruction. Even in your example "Climb to (two?) nine zero" Should be "Climb to (two?) Flight Level nine zero". This removes the possible error/threat.

➤ **The use of language other than English in communication**

- Foreign crews do not understand French language and that affects situational awareness
- Use of local language for chat and clearances to other aircraft on the frequency destroys situational awareness
- Local language leads to loss of SA by other carriers
- Use of Chinese to domestic traffic but English with others. This reduces SA
- General misuse of the English language, along with two different languages being used, depleting Situational Awareness
- Reunion/Madagascar. Comms between aircraft and ATC in French. Breaks down the situational awareness if you do not understand French or any other local language in the specific region.
- Whilst in Canadian (Quebec) airspace the insistence of both pilots and ATC to speak French. This seriously degrades situational awareness for non-French speakers.
- Use of a foreign tongue to locally based pilots, that if you do not speak means that you are not completely aware of what is happening around you with regards to other traffic
- Mixture of English and local language
- In some countries where native language is used with native flights other than English reduces situational awareness significantly, especially in busy terminal areas. In my humble opinion, I think English should always be used due to safety issues.

- *During one part of the interview, a pilot answered a question that expressed the sentiment of many pilots. The question was, “When controllers are speaking in their native language to their own pilots, is that much of an issue for you?” to which the pilot replied, “I feel out of the loop because I don’t know if the foreign carrier coming in might be conflicting traffic for me. You kind of know what the controller’s asking them and what they’re acknowledging. So, everybody’s sort of on the same sheet of music. I really have no idea what the controller might be asking the pilot. It makes me a little uneasy; for the most part, I guess they’re keeping things sorted out, I hope.”*

➤ Speech rate:

FAA의 연구결과에 따르면 미국 조종사들은 통신에서 가장 말하는 속도에 있어 큰 문제를 경험했다고 한다. 교통량 처리에 대한 부담이 증가함에 따라, 발언 속도와 반복적인 전송 횟수 또한 증가했다. 일부 조종사들은 조종사들이 숙련도 부족을 감추거나 숙련도를 과시하기 위해 더 빨리 말하는 것을 보이기도 한다.

실제로 Doc 9835(ICAO, 2004)5에 포함된 ICAO 언어 숙련도 평가 척도는 TEMPO를 고려 요소 중 하나로 사용하여 숙련도의 유창성 차원을 평가한다. 즉, 빠른 템포가 유창함에 대해 더 높은 점수를 받았다.

그러므로, 영어를 배우는 동안, 관제자들은 이 차원에 대해 더 높은 점수를 얻기 위해 더 빨리 말하라는 말을 들을 수 있다. 실제 언어능력은 덜 능숙할 수 있지만 관제용어만을 사용하여 업무를 하는 경우 관제사는 더 빠르게 말할 수 있다. 일반적으로 빨리 말하는 것은 특히 영어가 모국어 아닐 때 지시를 더 잘 이해하는데 도움이 되지 않는다.”

- *ATC providing too many instructions within one clearance ie altitude, heading, airspeed in same clearance. Controllers in general speaking too fast due to high volume of traffic and working several frequencies at once;*
- *Controllers usually speak too quickly and with strong accent, that can be dangerous. Pilots are also afraid of the consequences of an initial misunderstanding. It’s stressful without perceivable benefits;*
- *Comms too quick, resulting in say again or confusion.*
- *Authorized for X or Y approach, and then cleared to a point that is not on that specific approach. Reading of clearances extremely fast and then having to ask say again slowly 3 times.*

또 다른 언어와 관련된 문제는 영어권 이외의 국가에서 온 조종사들이 영어권 국가의 관제자들이 빨리 말하는 경향이 있다는 점이었다. 6개의 지역에 국한된 표현, 은어 또는 비표준 ICAO 용어를 사용함으로써 그들이 이해하기 어렵게 만들었다.

- *My experience is that most controllers in Australia speak too fast and in a slang that is very difficult to understand. Also they use the "climb TO nine zero". Also in the USA they often speak too fast and with a very strong accent. It is funny to see (hear) that most problems arise in so called English speaking countries. Also India is a big problem as they often seem to think that the faster they speak, the better they know the language. China and most other Asian countries have improved tremendously over the past years.*

➤ **Multiple Instructions:**

조종사들은 한번에 여러 개의 ATC 지시를 받았을 때, 그들은 이해의 오류에 더 민감하다고 지적했다. 통신은 짧고 간결한 지시를 포함해야 하며, 비행의 중요한 단계(예: 착륙 롤아웃 중 고속)에는 제공되지 않아야 한다.

- *Sometimes, controllers give too many instructions on a single call;*
- *Long streams of instructions with multiple numbers (alt, speed, heading, crossing alt, etc...);*
- *When the aircraft is slowing down to taxi speed (around 100 KTS), the tower gives you all kinds of taxi instructions including crossing a runway. This is not the best time to overload the first officer. The aircraft is still at high speed and the FO still has duties to carry. The tower should at least wait until the aircraft is off the runway or engaged on the taxiway*
- *Multiple instructions in one clearance...ie heading/alt/speed/turn*
- *Speaking too fast with multiple instructions.*
- *Controllers often issue more than 2 instructions in a single transmission.*

매우 빠른 스피치와 함께 여러 지시를 하는 항공 교통 관제사가 문제로 지적되었다.

- *Too many instructions/clearances in one transmission*
- *Too much information in a single message, specially during taxi instructions. Inflight, speed, headings and altitudes are not given in a standard and logical way, sometimes in different order. A logical order, speed/hdg/alt, according to most Boeing MCP display, could help a lot.*
- *Transmitting instructions that contain multiple elements*
- *Too many information (ex: more than 3 instructions). Use of slang that might be difficult to understand for non-native English speaker.*
- *Rate of speech in many MENA countries combined with the local accent*
- *Own wordings are often used. In local accent. Plus speed of speech.*
- *Use of very rapid speech, mostly by atc*
- *Fast mumbled taxi clearances*
- *Sometimes controllers are so busy that they don't speak clearly in an effort to say the instructions as quickly as possible.*

- *Multiple instructions that involve level, speed and conditional clearances, in busy airspace*

항공 교통 관제사의 억양/악센트, 더듬거림, 부적절한 띄어읽기, 비속어 및 서투른 영어

- *ATC/Pilot communicates in French which leaves other pilots out of the clue...*
- *Voice in Spanish/French to local operators and therefore identification of possible threats decreased.*
- *Half of the communication is in French which can result in a loss of awareness.*
- *Lack of English capability in China. Chinese is often spoken by ATC to Chinese pilots*
- *Use of Spanish/Chinese instead of English*
- *South American and Russian pilots are very hard to understand due pronunciation and omission of words. Greatest safety hazard though is the incorrect interpretation of ATC clearances and the failure of ATC to correct erroneous readback from pilots.*
- *They speak normally in mother language and the English level is very poor.*
- *language of the country such as French Spanish Chinese and Russian spoken on the radio*
- *Speaking French and Italian all the time with local Airlines*
- *Rapid speech and use of slang*
- *Common (spoken) language, slang.*
- *Use of slang, idioms, metaphors etc*
- *When either pilots or controllers use slang or heavily-local accent in their transmissions eg Americans and other native-english speakers. They have tendency of not using standard phraseology as long as they are using English (in their local twangs, irrespective), they reckon the rest of the world ought to understand them.*
- *Use of slang instead of standards (like "see you back in the triple nickel" instead of "at XXX point, contact NY on frequency 5550")*
- *EIDW: Local "Slang" is often used on the radio and clearances often include excessive information. LIRQ: Very poor English both spoken and understood by many controllers. LFPG: Use of French in such a busy airport often causes loss of situational awareness with regards to other traffic.*
- *Poor command of English is at the root of non-standard phraseology.*

➤ **Readback:**

조종사들은 종종 관제사가 리드백에 귀를 기울이지 않는다고 느꼈다. 때로는 조종사가 부정확한 판독 값을 작성하여 관제사가 감지하지 못하는 경우도 있었다. 조종사들은 의사소통의 관계를 유지하기 위하여 관제사가 리드백에 대한 확인이 필요하다고 지적했다.

- *When ATC gives clearance during flight that involves speed, hdg and FL all in the same sentence followed with break/break. One of the numbers often gets wrong and there is no read back to verify. Exp. speed 250 hdg 250 level 150 break/break;*
- *There is no need to do readback, and if you insist to do readback, they don't correct you if you make a mistake.*
- *Sometimes pilot's or atc don't give the read back and don't correct them.*

ICAO Annex 11 para 3.7.3.1 requires [“Flight Crew shall read back to the air traffic controller safety-related parts of ATC clearances and instructions which are transmitted by voice”⁸.](#)

ICAO Annex 10 – Volume II and PANS ATM (Doc.4444) provide rules and procedures for Pilot / Controller communications:

“Para 5.2.1.5.2: Transmissions shall be conducted concisely in a normal conversational tone.

Para 5.2.1.5.3: Speech transmitting technique should be such that the highest possible intelligibility is incorporated in each transmission. Fulfillment of this aim requires that air crew and ground personnel should:

- a) enunciate each word clearly and distinctly;
- b) maintain an even rate of speech not exceeding 100 words per minute. When a message is transmitted to an aircraft and its contents need to be recorded the speaking rate should be at a slower rate to allow for
- c) the writing process. A slight pause preceding and following numerals makes them easier to understand;
- d) maintain the speaking volume at a constant level;”

➤ **Transition altitude \ transition flight level**

일부 항공기의 상승 성능은 수년에 걸쳐 엄청나게 증가했으며, 그에 따른 상승률은 이륙 직후 항공기가 전환 고도에 도달하는 상황을 만들 수 있다.

일부 지역은 주변 대기 압력에 따라 변화된 전환 고도를 가진다. 세계적으로 전환 고도는 3,000에서 18,000 피트까지 다양할 수 있으며, 일부 국가는 매일 고도를 변경할 수 있다. 이러한 복잡성을 더하면 고도를 지정하기 위해 발 대신 미터기를 사용하는 것과 세계 일부 지역에서 QFE를 기반으로 하는 높이를 사용하는 것이다

많은 최신 항공기 형태는 전환 고도나 전이고도를 통과할 때 감박이는 고도계 설정 또는 유사한

'attention getter'를 가지고 있으며, 이는 비행 관리 시스템(FMS)의 데이터베이스에 프로그래밍 되며 조종사가 수정할 수 있다. 그러나 전이 고도 변동성은 당일 실제 전이 고도와 FMS 데이터베이스에 프로그래밍 되거나 수동으로 삽입된 고도 사이에 잠재적 불일치를 야기한다.

- *Transition altitude/flight level should be more consistent worldwide;*
- *The low transition altitude causes high workload down low, also opens up the 110 / 100 problem. Why not lift the transition altitude to 10,000 feet and level to FL110 in all countries where it is currently below 10,000 feet;*
- *Transition altitude is different in every country. Why can't there be a worldwide standard altitude where this happens.*

➤ **Cleared for the approach**

일부 조종사들은 항공기가 여전히 접근 절차가 시작되는 고도보다 높게 날 때 "cleared for the XYZ approach" 할 때 우려를 표시했다. 어떤 경우에는 이 허가가 항공기가 발간된 접근 고도까지 하강할 수 있음을 나타내는 반면, 다른 국가에서는 항공기가 활공각을 intercept 하거나 추가 하강 허가가 주어질 때까지 현재 고도를 유지해야 한다. 분명히 전 세계에 걸쳐 일관성이 결여되어 있어 승무원들이 가장 바쁠 수 있는 비행단계에서 위험요소로 작용한다.

- *ATC give specific descent altitudes in the approach phase. These are frequently not in accordance with the approach plate minima (higher) which is acceptable but then they clear you for the approach. In order to complete the approach further descent is now required. This frequently leads to ambiguity as to which altitude is acceptable to ATC. I believe that clear for the approach means clear to complete the approach in accordance with the procedure and using the stated altitudes. This is however often unclear and leads to additional RT to clarify and sometimes delay in descending which can lead to stability issues especially during NPA.*
- *Glide intercept altitude is 4000ft. Pilot have clearance to follow STAR (STAR MEA is 5000 then 4000) and have clearance for ILS approach with last cleared altitude 8000ft. May pilot initiate further descent according to STAR and intercept glide from 4000ft or he must be at 8000 ft? Does ATC must emphasize to descent according to STAR?*
- *At 6000ft on approach, "start descend for (!) thousand feet"*

➤ **Metric Altitude**

조종사들은 고도를 나타내기 위해 feet 대신 meters를 비표준으로 사용하는 것은 위험을 증가시켰다고 불평했다. 왜냐하면 새로운 항공기가 두 가지 측정을 모두 가지고 있더라도 meter vs feet 변환표를 가진 플라스틱 카드와 같은 대체 정보를 사용해야 했기 때문이다. 일부 현대 항공기는 미터/피트 선택 버튼을 통해 이 기능을 가지고 있다. 또한 사용 가능한 비행 수준은 인접 국가마다 다르기 때문에 국경을 넘을 때 고도 조정이 필요하다는 점에 주목했다. 예: 중국과 러시아는 사용 가능한

비행 고도법이 달라서 필요한 변경이 완료되지 않으면 표준 분리를 상실할 수 있다. 추가적인 혼란은 미터법 고도를 오르거나 내려갈 때에도 수직 속도 표시가 feet에 남아 있다는 사실이다.

- *A major threat that increases cockpit workload significantly is the use of METRIC altitudes when climbing and descending (as opposed to during cruise) especially at QFE airports where a conversion needs to be done between QFE Meters by ATC to QNH Feet for Aircraft systems;*
- *I would prefer altitude clearances to include the word "altitude", e.g. "descend to altitude 9,000 feet". SID clearances to altitudes above published SID constraints would be clearer if they included the word "unrestricted". The problems caused by use of metric Flight Levels are mitigated in my company by robust standard operating procedures and the use of a metric conversion card. However, FLs in China involve a metric level, but ATC frequently require a rate of climb / descent in feet per minute. Mixing two measurement units is not ideal.*
- *On very busy and difficult to understand frequency we were cleared to descend to FL 9800 meters using more than 2000 fpm rate of descent. Mixing units in a same clearance is common occurrence.*

➤ Altitude/Speed Constraints

승무원에게 속도나 고도 제한이 주어진다면, 후속 비행이 제공되었을 때 그러한 제한이 여전히 유효한지 항상 명확하지는 않다. 명확화가 자주 요구되어 빈도에 더 많은 혼잡을 초래하고, 종종 이미 바쁜데 업무량을 가중한다.

- *It is common when getting speed restriction that it is not clear if the restriction is still valid when transferred to a new controller;*
- *Speed restrictions on arrivals also remain a source of confusion among controllers despite the guidance the AIM provides (example: Airline ABC, max forward speed when at 12000 feet with a cross fix xxxxx @ 210 kts 10 miles ahead. Does that void the STAR speed restriction? It's not an expect, its a cross "at"; but ATC just said max forward. Had they said, max forward speed and void the speed restriction at XXXXX, that would be clear, or max forward speed but cross XXXXX at 210 kts, that would be clear; but they rarely do this, and then confusion reigns.)*

➤ Taxiing over a red stop bar

사용 활주로 진입로를 식별하기 위해 많은 공항에 **red stop bar** 이 설치되어 있다. 많은 보고서들은 비행 승무원들이 **red stop bar** 을 건너도록 지시받아서 혼란과 추가적인 통신을 초래한다고 언급했다. (혼란을 유발하는 지시는 추가적인 통신을 초래함!!!) 이 조사에서 ATC가 종종 조명을 끄기 보다는 활주로 홀딩 지점에서 'cross the red stop bar' 라고 지시하는 것으로 보고되었다. 일부 조종사

들은 또한 조명을 꺼달라고 요청했음에도 불구하고 그들의 요청이 거부되었고 line up하라고 지시 받았다고 말했다.

- *There is a tendency for ATC to clear aircraft to taxi through red stop bar lights onto active runway. If ATC doesn't get a read back because of frequency congestion they will get into a lengthy discussion with the specific aircraft crew about their lack of response when in fact no one can hear the clearance due to multiple transmissions at the same time (ATC and other aircraft);*
- *At a certain airport, the red stop bars at the holding point rwy 33L cannot be switched off therefore pilots have to cross a red stop bar all the times. This practise is very dangerous and has already been reported many times but so far with no effect.*
- *Clearance to Take off or to cross an active runway with a red stop bar still illuminated (no LVP in force)*
- *Approaching a Red "stop" bar whilst taxiing, a request to cross is made, and the aircraft cleared. But the bar remains red. The runway is active. A further request is made... "cross the red" will normally be the response... But not always. Gets confusing, especially whilst crossing an active runway.*
- *Notam and ATIS: Stop bars are ON for maintenance, some understand that they can cross when cleared to lineup for example*
- *ATC clearing you to cross a runway with stop bars (red) on, and instructing you to disregard the lights.*
- *Not using line up and wait behind clearance, also lots of airports do not exercise the Red stop bars and are left on when cleared to line up due to laziness of tower staff.*
- *Cleared to cross the runway hold short red lights (this is very frequent) some airlines reply that by their sop they are not allowed to cross any red bar. This seems to be the only way for them to switch those lights off when receiving clearance for line up or to cross an active runway.*
- *When ATC give clearances to be execute after a while, like "clear to cross after the ACFT on 3 nm final". They always forget the stop bars and we have to ask them again.*

The following information extracted from ICAO Doc 9870 AN/463 Manual on the Prevention of Runway Incursions First Edition 2007⁹:

"10. STOP BARS"

The following extracts from ICAO Standards and Recommended Practices are provided to assist flight crews in understanding the use and application of stop bars: Annex 2 — Rules of the Air, Chapter 3: "3.2.2.7.3 An aircraft taxiing on the maneuvering area shall stop and hold at all lighted stop bars and may proceed further when the lights are switched off."

This lack of harmonization with ICAO SARPs degrades global safety, as it may lead to flight crews crossing illuminated stop bars that are functioning as the last safety barrier."

➤ Route clearance while taxiing

일부 국가에서는 항공기가 활주로를 향해 활주하는 동안 항로 허가를 받는 것이 일반적인 관행이다. 일부 조종사들은 항공기를 조종하는 것에서 항로 허가를 read back하고 검토하기 위한 업무가 이륙 준비 중에 주의력을 빼앗기기 때문에 위험이 증가한다고 느낀다.

- *ATC Route clearance at some airfields are given during taxi out and more often than not, as the pilot is lining up with the "takeoff clearance"*
- *Certain airports in the Caribbean on Int'l flights use clearance delivery and ground control frequencies for engine start requests and taxi instructions. Then, they wait to issue the flight's clearance on tower frequency. At certain very busy airports, this practice seems to divert the tower controllers attention away from the arriving and departing aircraft in the immediate vicinity of the airports*

조종실 작업량이 가장 높은 상황에서 조종사가 주의를 산만하게 할 수 있기 때문에 안전상의 이유로 필요한 경우가 아니라면 조종사는 이륙, 최초 상승 또는 착륙 중 항공기로 송신해서는 안 된다.

➤ Other Communication Problems

조종사들은 그들 스스로 더욱 훈련되고 표준화된 표현을 사용해야 한다고 보고했다. 특히 바쁜 센터에서 그리고 둘 이상의 언어가 사용될 때.

- *Poor radio discipline throughout leads to congestion/interruptions/repeat instructions /repeat information/ delayed descent clearances and on and on;*
- *Long airway and taxi clearances were given. No radio discipline. Everyone keeps blocking each other. This is very specific to certain airspace.*
- *Poor RT discipline is the biggest threats, including the use of dual language. At CDG, I was nearly involved in a ground collision during pushback when my pushback clearance was cancelled in favour of another aircraft. The cancellation was given in French, which neither I nor my colleague understood. Although we did not acknowledge the cancellation, the other aircraft was cleared to push from the stand next to us. When I noted both of us moving at the same time something obviously wasn't right so I told my tug-team to stop pushing until I had resolved the situation.*
- *There are so many, I could write a book. And a very thick one at that. Its quite shameful that apparent professionals can have such poor discipline. Eg being told to cross stopbars, being issued altitude clearance without callsign, being issue tracking deviations and clearances without callsign, having altitude constraints ignored without being cancelled, being ignored on the radio when inconvenient to reply, being continually stepped on by pilots not listening out, being issued non standard terminology clearances with local words inserted etc etc etc etc.....*

관제사

관제사들의 응답은 조종사들의 적절한 readback이 되지 않는 것이 그들의 가장 큰 관심사라는 것을 보여주었다. 잘못된 readback, 불완전한 readback, 그리고 그들의 호출부호를 사용하지 않는 것이 가장 심각하게 언급된 문제들이다.

조종사들이 특정 속도가 할당되었을 때(주로 강하단계에서) 감속된 속도를 요청하지 않은 것은 때때로 분리 손실을 야기 시켰다. 질문을 받았을 때, 조종사들은 그들이 비행 속도에 관한 회사의 절차를 따라야 한다고 말했다. 그러나 그들은 회사의 절차를 알지 못할 것이라고 생각하여 바쁜 관제사에게는 자주 보고하지 않고 속도를 줄였다.

- *We have a problem with pilots reducing speed even though they were given a specific speed. This does occasionally result in loss of separation with trailing aircraft. This does often occur on downwind/base/final and with British/Chinese/Eastern European airlines.*
- *Some flights do not comply with clearances to reduce or increase speed while are vectored. They say that they are complying with company rules, and i am not familiar with company rules. So what should i do?!!*
- *Different company policies not allowing all of the pilots in the system to fly the airplanes more standardized. I.E. Lahso, speed on departure and speeds on final etc.....*

SID와 STAR는 관제사에게 늘 문제 상황을 만든다

- *I give a climb and maintain clearance to an altitude. This cancels any altitude restrictions on a SID. Pilots don't climb and ask if they have to comply with the SID. Busy ATC facilities make up none standard phraseology to avoid these question and pilots think this is standard.*
- *Clearing a commercial airline pilot on departure to an altitude above the restrictions on a SID and getting a questionable readback on altitude restrictions published on the SID from the pilot.*
- *U.S. pilots frequently question whether a new altitude assignment on a SID automatically cancels the crossing restrictions, taking up valuable frequency time. Some controllers have resorted to changing their own phraseology to include "cancel altitude restrictions" thinking they are helping. It is my belief that by EDUCATING pilots to understand the correct interpretation of the phraseology we can eliminate this confusion. Instead, we are using our "own" phraseology, creating a situation where now we are making pilots think that controllers HAVE to say "cancel altitude restrictions" in order to cancel them. U.S. air carriers also frequently "chip" on the arrival sector, thinking they are helping us, offering that they 'have*

traffic in sight and can follow it,' asking for their sequence, wanting to know why they have to follow slower traffic, etc...again, taking up valuable frequency time. Especially on arrival sectors, pilots should be more attentive to the frequency and instructions instead of trying to "assist" controllers by chatting on the frequency.

- *When an aircraft following SID/STAR and cleared TO some level, pilot should not ask whether any level or speed restrictions unless i am removing the restrictions, as it is inbuilt in the system of SID/STAR, when situation arises i can remove the restrictions and pass it on to the concerned aircraft*
- *Climb now FL100, when SID restriction of 6000'. Is that unrestricted/SID cancelled?*
- *After taking off, aircraft call approach. They are initially cleared to climb to FL120. I re-cleared them to climb FL190. They are supposed to comply with the SID, but nearly 90% of them say "I understand to climb FL190 UNRESTRICTED" and I just told them to continue to climb, nothing else*

결론은 설문조사에서 조종사와 항공 교통 관제사의 응답과 권고사항의 분석으로부터 도출되었다.

다음 요인들이 조종사 - 관제사 통신 오류에 기여하는 것으로 확인됨

□ 통신 오류의 가능성을 높이는 운영 요인은 다음과 같다.

- 비표준어법
- 음성 전달 속도
- 표준어법 대신 일반 항공 영어 사용
- 속어 사용
- 일반 항공 언어에서의 애매모호함(Ambiguity in general aviation language)
- Lack of Harmonization

=> 해당 요인들은 위험상황을 초래할 뿐 아니라, 확인을 위한 송신을 초래하여 주파수의 혼잡 원인이 되기도 한다.

□ 인간의 의사소통을 저해하는 다른 요소들은 다음과 같다

- 음성 알파벳을 포함한 영어 모음 기반 단어를 발음하는 데 있어 일부 비 원어민들의 어려움 (Difficulty for some non-native speakers in pronouncing English vowel-based words including the phonetic alphabet)
- 원어민 영어 억양 및 강한 영어 방언을 포함한 내용(Accents, including native English accents and strong English dialects)
- 비영어 speaker와 비영어 speaker의 의사소통

이러한 요인들은 다루기가 더 어렵지만 부분적으로 훈련을 통해 교정될 수 있다.

□ 비표준어휘의 사용은 조종사와 관제사의 효과적인 의사소통에 큰 장애물이다. 표준어법은 구어의 모호함을 줄임으로써 크게 도움이 되며, 따라서 사람들 사이의 공통된 이해를 증진시킨다

- 다른 모국어, 또는
- 동일한 모국어를 사용하지만 단어를 다르게 사용하거나 이해하는 사람(예: 지역 억양)

또는 사투리)

- 비표준어법이나 주요 단어의 누락은 의도된 메시지의 의미를 완전히 바꾸어, 잘못된 의사소통과 잠재적인 교통 충돌을 야기할 수 있다. 예를 들어 숫자를 포함하는 모든 메시지는 숫자가 가리키는 것(예: a flight level, a heading or airspeed)을 포함해야 한다. 키 워드의 포함은 잘못된 해석을 방지하는 데 도움이 되며, 읽기/듣기/듣기를 더 효과적으로 할 수 있다.

조종사와 조종사는 좋은 의도를 가지고 비표준어법을 사용할 수 있지만 표준 ICAO 어구를 사용하는 것은 오해의 가능성을 최소화하는 데 도움이 된다.

자료 출처 : Skyclip video: 'Readback-Hearback' (Eurocontrol)

"For safe air traffic control operations, it is crucial to have effective pilot-controller communication. The readback - hearback process is a fundamental part of that. ICAO defines this process as follows:

"안전한 항공 교통 관제를 위해서는 효과적인 조종사-관제사 의사소통이 필수적입니다. 리드 백 - hearback 과정은 그 기본입니다. ICAO는이 프로세스를 다음과 같이 정의합니다.

'The receiving station repeats the received message or appropriate part thereof back to the transmitting station to obtain confirmation of correct reception.'

'수신국은 수신 된 메시지 또는 그 적절한 부분을 송신 국으로 되풀이하여 올바른 수신을 확인한다.

Typically, errors occur when the controller does not detect and correct any errors in the readback with obvious consequences. That's why ICAO states that:

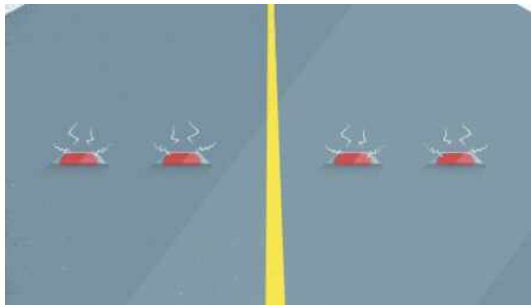
일반적으로, 예러는 관제사가 리드 백에서 오류를 감지하고 수정하지 않을 때 발생하기 때문에 ICAO는 다음과 같이 업무를 정의합니다.

1. safety related parts of all messages must always be readback,
모든 메시지의 안전 관련 부분은 항상 readback 되어야 하고,
2. readback must be complete and clear,
readback은 완전하고 명확해야 하며.
3. controllers must keep their transmissions simple and clear."
관제사는 전송을 단순하고 명확하게 유지해야 한다."

From: Readback Hearback (Skyclip video) Eurocontrol - Skybrary

** 해당 오디오 클립의 소유권은 해당 사이트에 있습니다.

Stopbars



<https://vimeo.com/158630249>

Call sign Confusion



<https://vimeo.com/184491539>

Conditional Clearance



<https://vimeo.com/190622166>

Sensory Illusions



<https://vimeo.com/206621329>

Controller Blind Spot



<https://vimeo.com/219830012>

TCAS - Always follow the RA



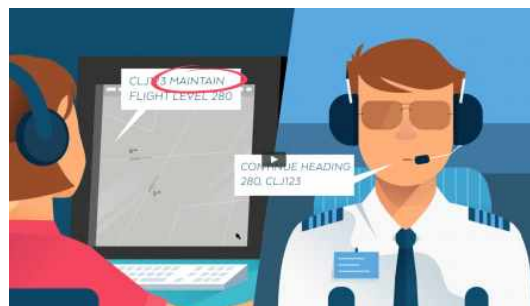
<https://vimeo.com/231510006>

Landing without ATC Clearance



<https://vimeo.com/236398698>

Readback Hearback



<https://vimeo.com/252486210>

Speed control for final approach /



<https://vimeo.com/259725834>

Pilot Fatigue



<https://vimeo.com/259725755>

TCAS RA High Vertical Rate



<https://vimeo.com/266073075>

Startle Effect



<https://vimeo.com/266073033>

In-Flight Fire



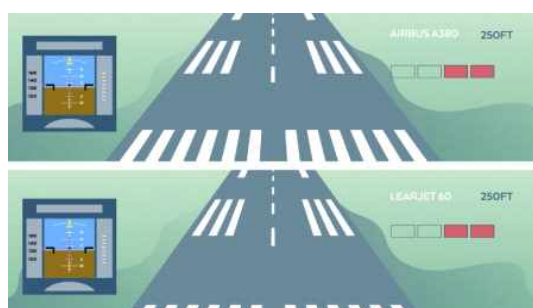
<https://vimeo.com/266073033>

CPDLC



<https://vimeo.com/290883737>

Aim point Selection



<https://vimeo.com/290883737>

Low Level Go Around



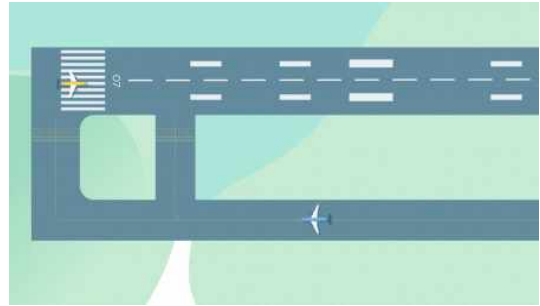
<https://vimeo.com/307830594>

Low visibility takeoff



<https://vimeo.com/307830450>

Immediate departure



<https://vimeo.com/315187000>

Airside driving



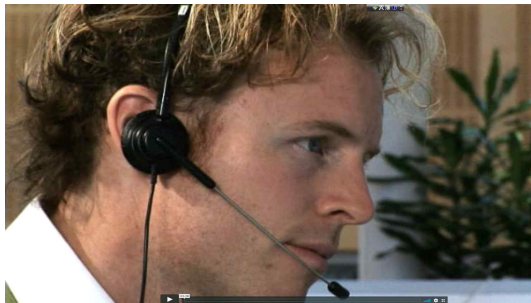
<https://vimeo.com/318226710>

Level busts



<https://vimeo.com/315186802>

Call sign confusion



<https://vimeo.com/164710071>

Blocked transmission



<https://vimeo.com/164710070>

Radio discipline



<https://vimeo.com/164710073>

Loss of Communication



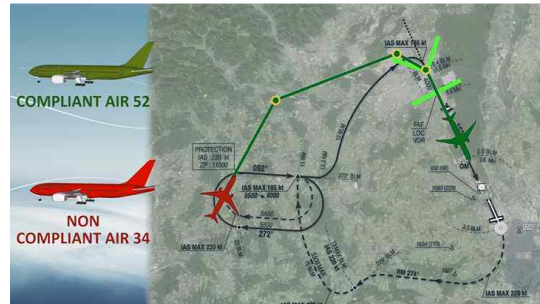
<https://vimeo.com/164710072>

Unstable approach – scenario “The late change”



<https://vimeo.com/164706209>

Non-stabilised – non-compliant approach. Short vectoring and interception from above.



<https://vimeo.com/258081265>

Unstable approach – scenario “Thank God it’s Friday”



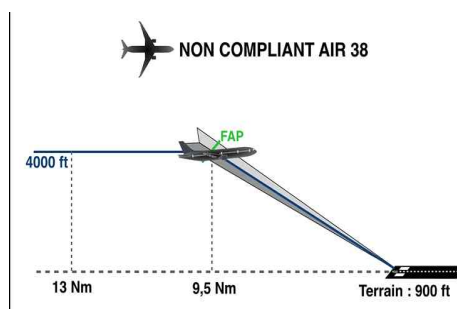
<https://vimeo.com/164706207>

VOLCANIC ASH



<https://vimeo.com/164596776>

Non-stabilised – non-compliant approach. Tailwind on final and high speed.



<https://vimeo.com/258138368>



비상사태(emergency)는 항공용어 정의대로 DISTRESS 또는 URGENCY를 포함한다.

DISTRESS 상태에 있는 조종사는 “MAYDAY”라는 용어로 초기 교신을 시작하여 비상사태를 선언할 수 있으며, 3회 반복한다. URGENCY 상태에 있는 경우 PAN-PAN이라는 단어를 동일한 방식으로 사용할 수 있다.

Mayday calls

"메이데이" 절차 단어는 1921년 런던 크로이돈 공항의 한 고위 라디오 담당자에 의해 유래되었다. 장교 프레드릭 스탠리 모크포드는 조난을 나타낼 단어와 비상시 모든 조종사와 지상 요원들이 쉽게 이해할 수 있는 단어를 생각해 달라는 요청을 받았다. 당시 파리 크로이돈(Croydon)과 르 부르젓 공항(Le Bourget Airport) 사이에 교통량이 많았기 때문에, 그는 프랑스어 m'aider('도와달라')의 단축형태인 'mayday'('help me')에서 'mayday'라는 표현을 제안했다. 5월의 휴일과는 무관하다

만약 라디오를 이용할 수 없어서 통화할 수 없는 경우, 다양한 다른 조난 신호와 도움을 요청하는 전화를 사용할 수 있다. 또한, 해당 항공기를 대신하여 다른 항공기를 통해 메이데이 통화를 전송할 수 있다.

미국 영공에서 일상적인 통화를 하는 민간 항공기는 편의상 필요한 부분 또는 관련이 없는 부분을 생략하고 다음과 같은 형식을 사용하도록 연방 항공국에 의해 권장된다.

메이데이, 메이데이, 메이데이,
 항공기 호출 부호 및 기종,
 비상 상황의 내용,
 조종사의 의도 및/또는 요청,
 현재 위치 및 방향,
 또는 항공기가 해당 위치에 있을 때 마지막으로 알려진 위치와 방향 및 시간,
 고도 또는 비행 수준, 연료 잔량(분);
 탑승한 사람 수,
 기타 유용한 정보

허위 조난 전화를 하는 것은 많은 국가에서 범죄 행위로서 벌금, 배상, 그리고 가능한 징역에 처해진다.

Other urgent calls

- Pan-pan

"판판판" (프랑스어: panne, '고장')은 "즉각적인 지원이 필요한 심각하고 임박한 위협"보다 낮은 질서의 기계적 결함이나 의료 문제와 같은 긴급 상황을 나타내었다.

'팬, 팬'이라는 용어는 "다른 사람들은 모두 조용히 해주십시오, 저에게 문제가 생겼으니 먼저 주파수를 이용해야겠습니다.~~"라는 말과 같다.

접미사 "메디코"는 영국 해역의 선박에 의해 의료 문제("판-판-판-약초", 3회 반복)를 나타내거나, 비행 중인 승객의 생명이 위독한 경우가 아닌 의료 비상상태를 선언하는 항공기 또는 제네바 협약에 따라 보호 의료운송으로 운영되는 항공기에 의해 추가되었다. "팬팬 메디코"는 더 이상 공식 사용되지 않는다.

- Declaring emergency

때때로 "비상상태 선포/declaring emergency"라는 문구가 "메이데이"라고 부르는 것의 대안으로 항공에서 사용된다. 예를 들어, 스위스 항공 111편은 상황이 악화되자 "스위스 에어 111 중량이 비상상태를 선포한다"라고 라디오를 통해 앞서 선포한 "팬팬팬"에서 상황이 더 긴급하고 위중해졌음을 알렸다.

그러나 국제민간항공기구(ICAO)는 '비상상태 선포' 대신 '팬팬팬'과 '메이데이' 통화의 사용을 권고하고 있다. "팬팬팬"과 "메이데이" 이외의 문구를 사용하는 조종사의 경우 항공기 취급에 혼선과 오류가 발생함에 대하여 경고하였다. 따라서 "비상"이라는 말은 교신 상황에서 의도된 효과를 낼 수도 있지만 그렇지 않을 수도 있으므로 확실히 비상을 전달하고 싶다면, "MAYDAY"로 교신할 것을 권장한다.

기타 정보

• 관제사는 조종사가 MAYDAY 또는 PAN-PAN이라는 단어를 사용하지 않고, 상황이 비상상태 또는 잠재적 비상상태를 구성하는 것이 의심스러운 경우, 비상상태인 것처럼 처리한다. 예를 들어, 조종사가 플랩 문제를 보고했지만 그들이 비상상태를 선포하기를 원하느냐는 질문에 거절한 조종사가 있을 수 있다. 항공 교통 관제사는 그들을 대신하여 비상상태를 선포했고, 비상상황에 대한 서비스를 제공하였다. 이제 이것 자체는 문제가 되지 않는다. 하지만 이제 승무원들은 그 사건에 대한 기록을 작성해야 하고, 승무원들은 상황을 해결하기 위한 유지보수 기록을 문서화 해서 제출해야 한다.



[바로가기](#)

Operational Issues	Human Performance	Enhancing Safety	Safety Regulations
 Air Ground Communication	 Airspace Infringement	 Wildlife Strike	 Controlled Flight Into Terrain
 Fire Smoke & Fumes	 Ground Operations	 Airworthiness	 Level Bust
 Loss of Control	 Loss of Separation	 Runway Excursion	 Runway Incursion
 Wake Vortex Turbulence	 Weather	 Emergency and Contingency	

주소 : https://www.skybrary.aero/index.php/Main_Page#operational-issues

Air Ground Communication

AGC

Description

"The passage of voice and/or data between an aircraft and a ground station such as air traffic control or aircraft operating agency."

The full article can be read [here](#).

See also the [ALLCLEAR?](#) toolkit.



https://www.skybrary.aero/index.php/Category:Air_Ground_Communication

Fire Smoke and Fumes

(Redirected from [Portal:Fire Smoke and Fumes](#))

FIRE, SMOKE & FUMES



Description

The effect of fire, smoke or fumes on an aircraft, its passengers and crew can range from inconsequential to catastrophic depending upon the type and the severity of the event, crew actions and the degree of their success, and, in the event of an uncontrollable in-flight fire, the time lapse between discovery of the fire and an on or off airfield landing. A general overview of the topic is given in the article "[Fire, Smoke and Fumes](#)".

Within this Category, the hazards associated with Fire, Smoke, & Fumes are discussed in articles grouped under the following sub-categories of [Operational Fires](#), [Post Crash Fires](#), [Combustion Related Smoke](#), [Non Combustion Related Fumes](#) and [Fire Protection](#).

Examples of events which involved Fire, Smoke & Fumes can be found in the article "[Accident and Serious Incident Reports: FIRE](#)"

https://www.skybrary.aero/index.php/Portal:Fire_Smoke_and_Fumes

Loss of Control

LOC

Description

On this page you can see all the articles related to the subject of **Loss of Control**. While many of the subjects covered within the Category are not in themselves loss of control issues, the mishandling of those events could very rapidly result in a loss of control situation.

Loss of control in flight is a major cause of fatal aircraft accidents. Loss of control usually occurs because the aircraft enters a flight regime which is outside its normal envelope. The full article can be read [here](#).



https://www.skybrary.aero/index.php/Category:Loss_of_Control

Wake Vortex Turbulence

WAKE

Description

All aircraft generate vortices at the wing tips as a consequence of producing lift. The heavier the aircraft and the slower it is flying, the stronger the vortex. Among other factors, the size of the vortex is proportional to the span of the aircraft which generates it.

At low altitudes, vortices generally persist for as long as 80 seconds, but in very light or calm wind conditions, they can last for up to two and a half minutes. Once formed, vortices continue to descend until they decay (or reach the ground). Decay is usually rapid and occurs more quickly in windy conditions. Cross-winds can carry a vortex away from the flight path of the aircraft.



https://www.skybrary.aero/index.php/Category:Wake_Vortex_Turbulence

Ground Operations

GND

Description

Ground Operations involves all aspects of aircraft handling at the airport, as well as aircraft movement around the aerodrome except on active runways. The safety challenges of ground operations are partly associated directly with those operations; for example, ensuring that aircraft are not involved in collisions and that the jet efflux from large aircraft does not endanger small ones. Even more important, ground operations are about preparing aircraft for departure in such a way that the subsequent flight will be safe; for example, correct loading of cargo and baggage, sufficient and verified fuel of adequate quantity and quality and the correct use of ground deicing and anti-icing facilities, where appropriate.



https://www.skybrary.aero/index.php/Category:Ground_Operations

Loss of Separation

LOS

Description

Loss of separation between aircraft occurs whenever specified separation minima are breached. Minimum [separation standards](#) for airspace are specified by ATS authorities, based on ICAO standards.



Types of Loss of Separation

Loss of separation may be either in a vertical or a horizontal plane, or both. Loss of separation may ultimately result in a [mid air collision](#). A [Level Bust](#) is one scenario where a loss of separation occurs, leading potentially to a mid air collision. Loss of separation from [notified airspace](#) is dealt with under [Airspace Infringement](#). Loss of separation from the ground is dealt with under [Controlled Flight Into Terrain \(CFIT\)](#). Loss of separation between aircraft on the ground is dealt with under [Ground Operations](#) and [Runway Incursion](#).

Wake vortex, which may be a consequence of loss of separation between aircraft on the same track, is covered in the category: [Wake Vortex Turbulence](#).

https://www.skybrary.aero/index.php/Category:Loss_of_Separation

Weather

WX

Description

On this page you will find articles on the subject of Weather. The articles are listed below according to subject area.

If you are a new visitor to this SKYbrary Category, a good starting point is the entry level article [Weather](#).

You may also be interested in a list of [Accidents and Incidents which feature weather as a factor](#).



<https://www.skybrary.aero/index.php/Portal:Weather>

Wildlife Strike

WS

On this page you will find articles on the subject: Wildlife Strike.

Description

A wildlife strike is a collision between an animal (most often a bird, but sometimes another species) and a man made vehicle, especially aircraft. Wildlife strikes constitute a serious hazard to aircraft safety and have caused a number of fatal accidents.



https://www.skybrary.aero/index.php/Category:Wildlife_Strike

Runway Excursion

RE

Definition

When the wheels of an aircraft on the runway surface depart the end or the side of the runway surface.

"A veer off or overrun off the runway surface." (ICAO)

Description

Runway excursions can occur on takeoff or on landing. They consist of two types of events:

- **Veer-Off:** Excursion in which an aircraft departs the side of a runway
- **Overrun:** Excursion in which an aircraft departs the end of a runway



	<u>Overrun on Take Off</u> A departing aircraft fails to become airborne or successfully <u>reject the take off</u> before reaching the end of the runway.
	<u>Overrun on Landing</u> A landing aircraft is unable to stop before the end of the runway is reached.
	<u>Veer Off</u> An aircraft departs the side of the runway after touchdown on landing or departs the side of the runway during the take off run.

https://www.skybrary.aero/index.php/Category:Runway_Excursion

Emergency and Contingency

Description

This category contains articles covering various aspects of Emergency and Contingency. The articles are grouped together under the subcategories:

- Aircraft Emergency & Unusual Situations
- Emergency Response Planning
- ANS Contingency Planning



https://www.skybrary.aero/index.php/Portal:Emergency_and_Contingency

	
Aircraft Emergency and Unusual Situations	ANS Contingency Planning
<p>The following 43 pages are in this category, out of 43 total.</p> <p>A</p> <ul style="list-style-type: none"> • An aircraft without transponder - Guidance for Controllers • ATC Operations in Weather Avoidance Scenarios <p>B</p> <ul style="list-style-type: none"> • Bird Strike on Final Approach: Guidance for Flight Crews • Bird Strike: Guidance for Controllers • Bomb Warning: Guidance for Controllers • Brake Problems: Guidance for Controllers <p>C</p> <ul style="list-style-type: none"> • Communication Failure: Guidance for Controllers • Crew Incapacitation: Guidance for Controllers <p>D</p> <ul style="list-style-type: none"> • Direct Emergency Communication <p>E</p> <ul style="list-style-type: none"> • Electrical Problems: Guidance for Controllers • Emergency Communications • Emergency Descent: Guidance for Controllers • Emergency Descent: Guidance for Flight Crews • Emergency Evacuation on Land • Emergency Turn • Engine Failure: Guidance for Controllers • Engine/APU on Fire: Guidance for Controllers 	<p>A</p> <ul style="list-style-type: none"> • Achievement of Contingency Planning <p>C</p> <ul style="list-style-type: none"> • Centralised National Contingency Facilities • CFMU in Contingency Operations • Co-located Contingency Facilities • Conflict Free Routing under Contingency • Contingency Planning • Contingency Planning: Volcanic Ash • Contingency Process • Contingency Strategies • Crisis Management <p>D</p> <ul style="list-style-type: none"> • Degraded Modes of Operation • Delegation of Air Traffic Services

<p>F</p> <ul style="list-style-type: none"> • Fuel Dumping - Guidance for Controllers • Fuel Dumping: Guidance for Flight Crews • Fuel Emergencies: Guidance for Controllers <p>G</p> <ul style="list-style-type: none"> • Guidelines for Dealing with Unusual/Emergency Situations in ATC <p>H</p> <ul style="list-style-type: none"> • Hydraulic Problems: Guidance for Controllers • Hydraulic Problems: Guidance for Flight Crews <p>I</p> <ul style="list-style-type: none"> • In-Flight Fire: Guidance for Controllers • In-Flight Fire: Guidance for Flight Crews • In-Flight Icing: Guidance for Controllers <p>L</p> <ul style="list-style-type: none"> • Landing Gear Problems: Guidance for Controllers • Landing Gear Problems: Guidance for Flight Crews • Loss of Cabin Pressurisation <p>M</p> <ul style="list-style-type: none"> • Medical Emergencies - Guidance for Flight Crew • Mountainous Terrain Escape Routes <p>O</p> <ul style="list-style-type: none"> • Operations in Crude Oil Smoke: Guidance for Flight Crews <p>P</p> <ul style="list-style-type: none"> • Passenger Medical Emergencies: Guidance for Controllers • Pilot Incapacitation • Pressurisation Problems: Guidance for Controllers • Pressurisation Problems: Guidance for Flight Crews <p>R</p> <ul style="list-style-type: none"> • Radiation Cloud: Guidance for Flight Crews <p>S</p> <ul style="list-style-type: none"> • System Wide Events: Guidance for Controllers • System Wide Events: Guidance for Flight Crews <p>U</p> <ul style="list-style-type: none"> • Unlawful Interference: Guidance for Controllers <p>V</p> <ul style="list-style-type: none"> • VFR Loss of Positional Orientation: Guidance for Controllers • Volcanic Ash: Guidance for Controllers • Volcanic Ash: Guidance for Flight Crews 	
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Controlled Flight Into Terrain

CFIT

Description

Controlled Flight into Terrain (CFIT) occurs when an airworthy aircraft under the complete control of the pilot is inadvertently flown into terrain, water, or an obstacle. The pilots are generally unaware of the danger until it is too late.

Most CFIT accidents occur in the approach and landing phase of flight and are often associated with non-precision approaches.

Many CFIT accidents occur because of loss of situational awareness, particularly in the vertical plane, and many crash sites are on the centreline of an approach to an airfield. Lack of familiarity with the approach or misreading of the approach plate are common causal factors, particularly where the approach features steps down in altitude from the initial approach fix to the final approach fix.



https://www.skybrary.aero/index.php/Category:Controlled_Flight_into_Terrain

Level Bust

LB

Description

A level bust occurs when an aircraft fails to fly at the level to which it has been cleared, regardless of whether actual loss of separation from other aircraft or the ground results. Level busts are also known as Altitude Deviations.

Definition

A level bust is defined by EUROCONTROL as: *Any unauthorised vertical deviation of more than 300 feet from an ATC flight clearance.*

The full article can be read [here](#)



https://www.skybrary.aero/index.php/Category:Level_Bust

Runway Incursion

RI

Description

International Civil Aviation Organisation (ICAO) defines a [Runway Incursion](#) as:
“Any occurrence at an aerodrome involving the incorrect presence of an aircraft vehicle or person on the protected area of a surface designated for the landing and take off of aircraft”.



A general overview of the topic can be found in the article ["Runway Incursion"](#).
Articles addressing specific aspects of runway incursion are listed below under the sub-categories [Airport Design and Infrastructure](#), [Preventing Incorrect Presence on Runway](#), [Runway Incursion Safety Nets](#), and [Organisational Defences Against Runway Incursion](#).

A comprehensive list of Accidents and Incident Reports on SKYbrary relating to Runway Incursion can be found in the article ["Accident and Serious Incident Reports: RI"](#)

https://www.skybrary.aero/index.php/Portal:Runway_Incursion

			
▼ Airport Design and Infrastructure	▼ Preventing Incorrect Presence on Runway	▼ Runway Incursion Safety Nets	▼ Wrong Runway Use Inappropriate



☑ 유로 컨트롤 표준관제 용어 학습 사이트 [바로가기](https://trainingzone.eurocontrol.int)

출처 : 유로컨트롤 Training Zone, <https://trainingzone.eurocontrol.int>




Say Again?

Phraseology Database

- Aerodrome and Vicinity (133)
- Aircraft (35)
- Approach Control Services (107)
- Area Control Services (46)
- Coordination between ATS Units (25)
- CPDLC (5)
- Emergency or unusual situation (14)
- General (129)
- General ATS Surveillance Service Phraseologies (54)
- Ground Crew (7)
- SSR and ADS-B Phraseologies (21)

- 8.33 KHZ CHANNEL SPACING (4)
- ACAS RA (4)
- ACKNOWLEDGEMENT (3)
- AERODROME INFORMATION (16)
- AERODROME TRAFFIC CIRCUIT (9)
- AFTER LANDING (8)
- AFTER TAKE-OFF (8)
- ALERTING PHRASEOLOGIES (4)
- APPROACH INSTRUCTIONS (29)
- APPROVAL REQUEST (6)
- AREA CONTROL INSTRUCTIONS (7)
- CHANGE OF CALL SIGN (2)
- CHANGE OF CLEARANCE (4)
- COMMUNICATIONS AND LOSS OF COMMUNICATIONS (5)
- CPDLC OPERATIONS (5)
- DEPARTURE INSTRUCTIONS (6)
- EMERGENCY DESCENT (2)
- ESTIMATES AND REVISIONS (7)
- EXPECTED APPROACH TIME (4)
- GNSS SERVICE STATUS (4)
- HOLDING (6)
- IDENTIFICATION (11)
- INFORMATION TO AIRCRAFT (7)
- ISSUANCE OF A CLEARANCE (11)

Phrases will appear here when you make a selection.

- (aircraft call sign) CLEARED TO.
- (aircraft call sign) LOW ALTITUDE WARNING, CHECK YOUR ALTITUDE IMMEDIATELY, QNH IS (number) [(units)]. [THE MINIMUM FLIGHT ALTITUDE IS (altitude)].
- (aircraft call sign) NOT RELEASED [UNTIL (time or significant point)].
- (aircraft call sign) RELEASED [AT (time)] [conditions/restrictions].
- (aircraft call sign) REQUEST APPROVED [(restriction if any)].
- (aircraft call sign) TERRAIN ALERT, (suggested pilot action, if possible).
- (aircraft call sign) UNABLE (alternative instructions).
- (aircraft type) (destination).
- (aircraft type) (position) (level) INFORMATION (ATIS identification) FOR LANDING.
- (aircraft type) REPORTED (description) ICING (or TURBULENCE) [IN CLOUD] (area) (time).
- (condition) LINE UP (brief reiteration of the condition)
- (distance) FROM TOUCHDOWN ALTITUDE (or HEIGHT) SHOULD BE (numbers and units).
- (distance) FROM TOUCHDOWN.
- (distance) FROM TOUCHDOWN.
- (distance) FROM TOUCHDOWN. ALTITUDE (or HEIGHT) SHOULD BE (numbers and units).
- (manoeuvre, SQUAWK or IDENT) OBSERVED. POSITION (position of aircraft). [(instructions)].
- (name of unit) CLEARS (aircraft call sign).
- (number) METRES LEFT (or RIGHT) OF TRACK.

☑ 실제 교신을 들어볼 수 있는 사이트의 목록

☞ 해당 사이트에 업로드 되어 있는 교신이 표준이 아닐 수 있으며, 해당상황에서 어떤 방식으로 의사소통하는 것이 바람직한지 연습하고, 토의해볼 수 있는 자료로 활용하시길 바랍니다.

☞ 권장 학습 방법 : 해당 사이트의 교신의 실제 내용을 받아쓰기 하여 보고, 관제사 및 조종사의 상황을 이해하고 교신 중에 사용한 문장구조 및 단어, 발음 등을 학습합니다. 추가적으로 해당 교신상황에서 더 간결하고 명확하게 교신할 수 있는 본인의 문장을 만들어 봅니다. 그리고 실제 시뮬레이션 실이나 교실 등에서 역할을 분담하여 상황을 재현하는 롤플레이를 진행해 봅니다. 마지막으로 해당 상황에 대한 요약(summary)와 해당상황에 대한 처리에 대한 평가(evaluation)를 일반영어로 발화해 봅니다.

사이트 명칭 : English4aviation

비정상 상황별 실제 교신 상황을 들어 볼 수 있는 사이트

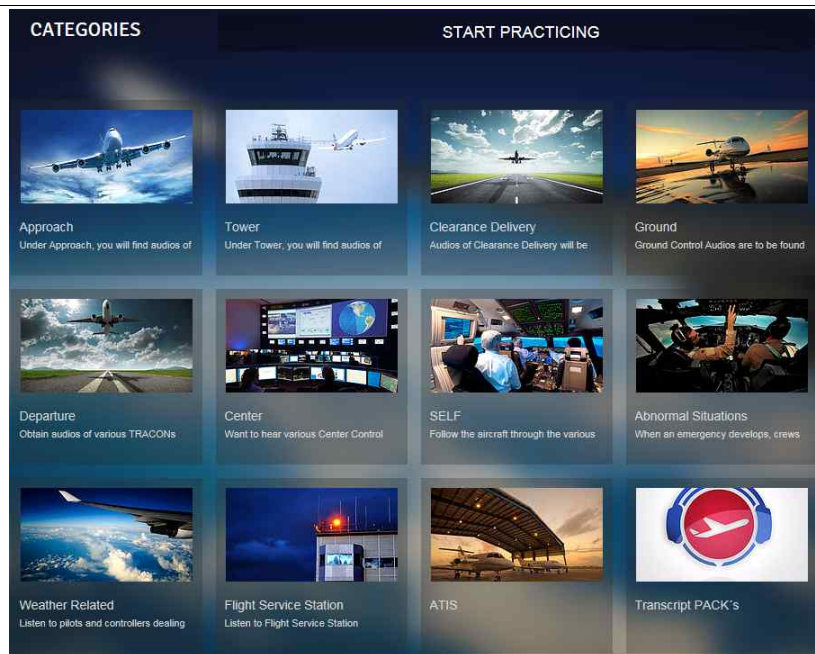
<http://english4aviation.pbworks.com/w/page/23998649/problem%20-20%20Listening%20to%20them#Communication>

The screenshot shows the English4aviation website interface. At the top, there's a navigation bar with 'Wiki' and 'Pages & Files' tabs. Below this, a disclaimer states: 'If you are citizen of an European Union member nation, you may not use this service unless you are at least 16 years old.' The main content area is titled 'Problems - Listening to them' and is marked as '(redirected from problem -20 Listening to them)'. It shows the page was last edited by Béatrice H. Alves 1 year ago. A 'Page history' link is visible. The main content is a numbered list of 26 items, each a clickable link to a specific aviation scenario or problem.

1. [Communication](#)
2. [A normal flight](#)
3. [Actual recordings without explanation](#)
 - i. [Baggage cart blown near the runway](#)
 - ii. [Can't land at Newark](#)
 - iii. [Complaining about taxilights](#)
 - iv. [Engine failure after take-off](#)
 - v. [On the importance of reading back taxi instructions after a long flight](#)
 - vi. [Engine fire and Compressor Stall](#)
 - vii. [Undercarriage issues followed by low fuel at JFK](#)
 - viii. [Alitalia with Landing Gear Problems at JFK](#)
 - ix. [Unruly passenger onboard](#)
 - x. [Leading to a Crash](#)
 - xi. [Etiquette](#)
 - xii. [Smoke in the cockpit](#)
 - xiii. [A tough day at JFK](#)
 - xiv. [Diversion due to cargo fire warning](#)
 - xv. [Air China 981](#)
 - xvi. [Wildlife and ATC](#)
 - xvii. [Medical emergency](#)
 - xviii. [Tell my wife I love her](#)
 - xix. [Weird approach at JFK](#)
 - xx. [Abnormal situation \(listening exercise\)](#)
 - xxi. [Emergency landing at JFK \(right main gear not extended\)](#)
 - xxii. [Engine fire just before V1](#)
 - xxiii. [Speed bird low on fuel in Singapore](#)
 - xxiv. [How important are good readbacks?](#)
 - xxv. [Hypoxia emergency](#)
 - xxvi. [Follow taxi instructions](#)

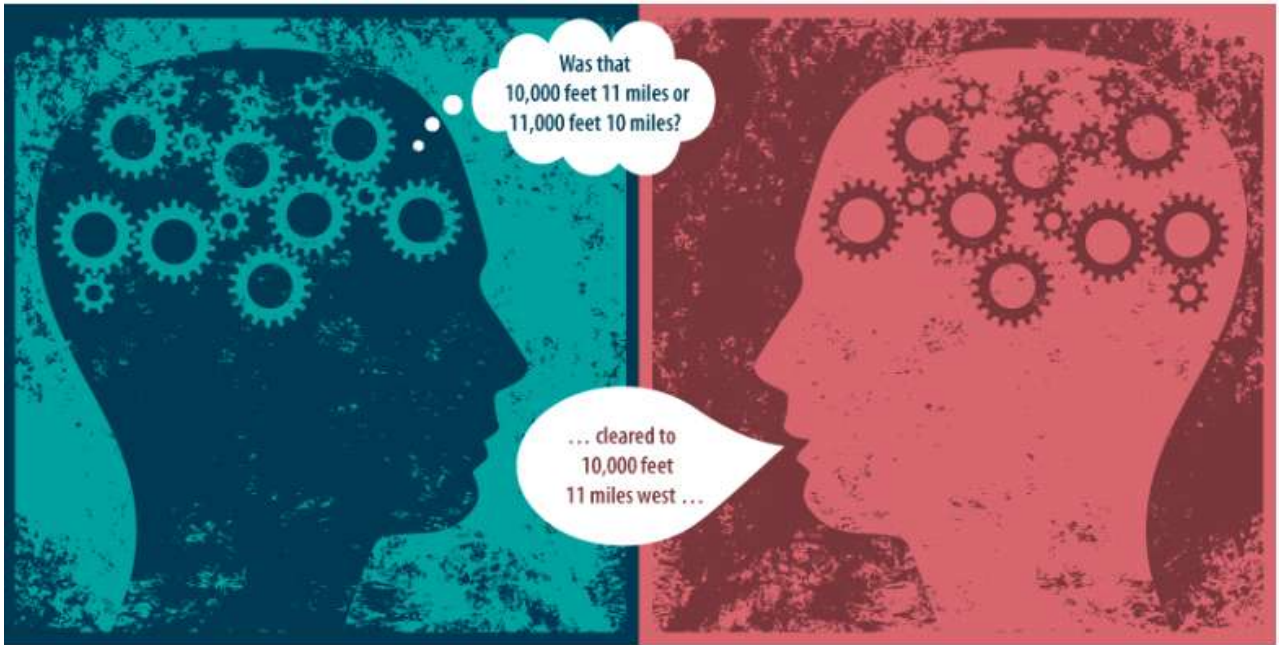
사이트 명칭: Aviation Listeners

<https://www.aviationlisteners.aero/>



Useful links - Listening comprehension

<u>Airplane Geeks</u> podcasts	Lots of podcasts on a great variety of topics, all related to aviation of course. You can download them and listen to them on you MP3 or whatever player you have while driving, walking or running. http://www.airplanegeeks.com/
<u>Aldo's channel</u>	Lots of real recordings with their transcription. https://www.youtube.com/user/aldo0815
<u>Aviation Listeners</u>	Lots of listening exercises (with worksheets) based on actual recordings in all phases of the flight https://www.aviationlisteners.aero/
<u>Pilot edge</u>	Some audio samples of communication https://www.pilotedge.net/pages/example-audio
<u>Aviation 101</u>	https://www.youtube.com/user/MrAviation101




☒ 가능한 비정상 시나리오 목록

Content:

1. Rejected Takeoff
2. Engine Failure / Fire after V1
3. Engine Limit, Surge, Stall, Severe Damage and Separation
4. One Engine Inoperative Cruise / Driftdown
5. One Engine Inoperative Approach
6. Go-Around and Missed Approach - One Engine Inoperative
7. Rapid Descent
8. Ground Proximity Warning System (GPWS) Response
9. Windshear at Takeoff
10. Windshear Escape Maneuver
11. Windshear in Flight
12. Windshear during Approach
13. RA in Landing Configuration
14. TA ONLY Mode
15. Flap Extension using the Secondary or Alternate System
16. Pilot Incapacitation
17. Low Fuel Temperature
18. Low Fuel
19. Fuel Jettison
20. Tire Failure during or after Takeoff
21. Command Speed for Landing -- Non Normal
22. Bounced Landing Recovery
23. Directional Control Problem on Landing Rollout (Slippery Runway with a Crosswind)
24. Landing on a Flat Nose Wheel Tire
25. Gear Disagree

<https://www.theairlinepilots.com/forumarchive/b777/b777nonnormalprocedures.php>

☑ 사고관련 교신 자료를 볼 수 있는 곳


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[SITEMAP](#)

통합검색

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[항공사고조사](#)
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[위원회소개](#)

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 >
 항공사고조사보고서

항공사고조사

항공사고조사 업무소개

항공사고조사보고서

 국내외 주요 항공사고

 12개월이상 조사중인 사고

 관련사이트

항공사고조사보고서

총 217개의 게시물이 있습니다.

No	Date of Occurrence	Date of Publication	Accident or Serious Incident	Operation's Name	Type of Aircraft	Aircraft registration number
217	2017/01/01	2019/06/21	경량항공기 사고	개인	SAVANA JABIRU	HLC114
216	2017/11/16	2019/06/21	항공기 사고	에어토피스	AS350B-2	HL9170
215	2016/06/06	2019/06/21	항공기 사고	미국 UPS항공	MD-11F	N277UP
214	2018/04/12	2019/03/27	초경량비행장치 사고	오름열기구투어	Cameron Z-275	S5001Y
213	2017/05/08	2019/03/27	항공기 사고	산림청 산림항공본부	KA-32T	HL9414

사고조사 마다 해당 CVR 녹취가 포함되어 있습니다.

해당 사항이 발생하였을 경우 어떤 용어를 사용하여 어떻게 교신을 해야 할지 학습하실 수 있습니다.

NTSB 등 국외 사고조사 사이트를 방문하여 관련 내용을 찾아서 학습하신다면 전반적인 항공 영어능력 향상에 도움이 될 수 있습니다.