RASMAG

SAFETY BULLETIN

Regional Airspace Safety Monitoring Advisory Group (RASMAG)

RASMAG was formed by ICAO Asia Pacific Regional Office to centralize the assistance to States and advice on regional airspace safety and monitoring activities involving flight operations and the air traffic services. The primary task of the group is to review the monitoring and safety assessment activities carried out by the regional monitoring agencies established by APANPIRG for implementation and operation of reduced separation minima.

HIGHLIGHTS
FROM THE ICAO DOC 10037 GLOBAL OPERATIONAL DATA LINK (GOLD) MANUAL

INTRODUCTION

Data link services, such as ADS-C and CPDLC, provide communications that are intended to support safer and more efficient air traffic management, and increase airspace capacity. In airspace where procedural separation is being applied, the data link services help improve communication, surveillance and route conformance monitoring.

The guidance material and information concerning the data link operations and procedures are consolidated into the ICAO Doc 10037 Global Operational Data Link (GOLD) manual to facilitate the uniform application of Standards and Recommended Practices throughout the world.

This bulletin highlights the guidance provided in the upcoming second edition of the GOLD manual. This manual clarifies procedures in light of lessons that have been learned over many years of data link operations. The purpose of this bulletin is to provide this guidance to help mitigate operational errors that have been reported by flight crews and controllers around the world.

Examples of reported occurrences include:

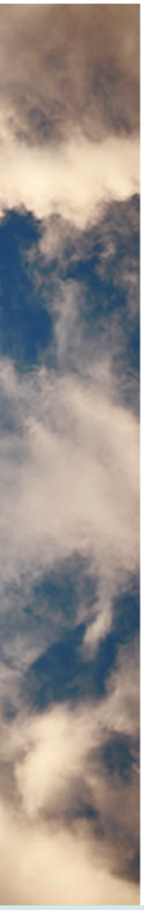
- The flight crew mistook flight level counteroffer as a clearance: The flight crew requested a level change and the controller attempted to find a time when the requested flight level was available in order to deliver the clearance. The flight crew mistook the counteroffered message as the clearance to change level.

- ATC gave a clearance for an alternative flight level but the flight crew maneuvered to the requested flight level: The flight crew requested a climb/descend to a specific level, which was not available due to traffic. The controller delivered an alternative clearance for a level other than the requested level. The flight crew mistakenly perceived the clearance to be for the flight level that had been requested and climbed/descended to the incorrect flight level. For these cases, phraseology was determined to be the issue.

- Conditional clearances resulted in flight crews' operational errors: There were reported occurrences involving conditional clearances where the flight crew climbed/descended before the 'AT TIME' constraint given in the clearance. To address the aforementioned issues, specific guidance for flight crews and controllers was added to the GOLD manual to clarify the use of "EXPECT" message elements, how to negotiate clearances and how conditional clearances should be used.

The manual also emphasizes the use of standard message elements and recommends flight crew's interactions with CPDLC messages to avoid operational errors resulting from human factor issues.

HIGHLIGHTS FROM THE GOLD MANUAL, 2ND EDITION



1) THE USE OF CPDLC UPLINK ELEMENTS CONTAINING "EXPECT"

The EXPECT message elements are useful for planning purposes but they can lead to operational errors when flight crews mistakenly interpret them as clearances.

For example,

a) The flight crew requested CLIMB TO FL370, which was unavailable due to traffic. The controller responded as, "UNABLE, DUE TO TRAFFIC, EXPECT FL350".

b) The flight crew may then immediately climb to FL350, or mistakenly maneuver to FL370 (the requested flight level).

Therefore, the scope for EXPECT message elements has been clarified as following:

FOR FLIGHT CREWS

Flight crews should NOT comply with an EXPECT message as if it was a clearance. An exception is when the EXPECT message element is received as part of an ATC departure clearance where compliance may constitute part of the Radio Communication Failure procedure (RCF).

FOR CONTROLLERS

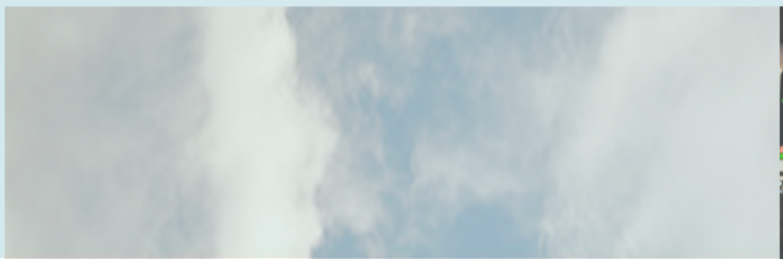
Controllers should use the EXPECT message elements when responding to a flight crew request and when procedurally required to advise a flight crew.

For example,

Flight crew	WHEN CAN WE EXPECT HIGHER LEVEL
Controller	EXPECT HIGHER AT TIME (time), or EXPECT HIGHER AT (position)
Controller (to notify that onward clearance may be issued at the specified time)	EXPECT FURTHER CLEARANCE AT TIME (time)

Controllers should **avoid** using the following message elements due to flight crew's potential for misinterpretation. Flight crews may interpret them as clearances and immediately take action. The examples to avoid are:

- EXPECT (route clearance)
- EXPECT (altitude)
- AT (position) EXPECT CLIMB TO (altitude)
- EXPECT TO CROSS (position) AT or BELOW (altitude)



2) CLEARANCE NEGOTIATION

Some safety occurrence reports indicated that the flight crew mistook a negotiation as a clearance to change the flight level.

For example,

a) The flight crew requested a particular flight level, which was unavailable.

b) The controller responded as, "UNABLE, MAINTAIN (current level), EXPECT (a different level)".

c) Then the flight crew erroneously maneuvered to the requested flight level which led to a conflict with another aircraft.

To address this issue, the guidance for clearance negotiation has been clarified for both flight crews and controllers.

FOR CONTROLLERS

If a clearance request contained in a CPDLC message cannot be issued, the controller should:

a) Send RSPU-1 UNABLE to deny the request prior to issuing any subsequent clearances;

b) Include any reason for the rejection when relevant; and

c) Investigate whether an alternative clearance can be issued as follows:

- If the controller deems that the flight crew is likely to accept an alternative clearance (intermediate level or deferred climb), the controller may uplink the clearance in the same message or in a separate CPDLC message.
- If the controller deems that the flight crew might not be able to accept any alternative clearance (higher level or route modification), the controller should negotiate the clearance with the flight crew prior to issuing it.

For example, the aircraft is maintaining FL330. The controller is unable to issue the requested clearance and issues an alternative clearance to a flight level that is lower than requested.

Flight crew	LVLD-2 REQUEST CLIMB TO FL370
Controller	RSPU-1 UNABLE SUPU-2 DUE TO TRAFFIC LVLU-6 CLIMB TO FL360
Flight crew	RSPD-1 WILCO or RSPD-2 UNABLE

Flight crew	LVLD-2 REQUEST CLIMB TO FL370
Controller	RSPU-1 UNABLE SUPU-2 DUE TO OPPOSITE DIRECTION TRAFFIC
Controller	LVLU-6 CLIMB TO FL350. LVLU-24 REPORT MAINTAINING FL350
Flight crew	RSPD-1 WILCO or RSPD-2 UNABLE

FOR FLIGHT CREWS

When negotiating a higher or lower altitude, the appropriate standard message elements should be used, e.g.,

- LVLU-30 WHEN CAN YOU ACCEPT (level single); or
- LVLD-15 WE CAN ACCEPT (level single) AT TIME (time)

Flight crews should recognize that the **negotiation does not constitute a clearance even when the option under negotiation could be accepted immediately.**

3) CONDITIONAL CLEARANCE

A conditional clearance is an ATC clearance given to an aircraft with certain conditions or restrictions such as changing a flight level before or after a time or place. While conditional clearances may increase the operational efficiency of the airspace, they have been associated with a large number of operational errors. Conditional clearances require special attention by the data link user, particularly for a non-native English speaking data link user.

FOR CONTROLLERS

Controllers should only use conditional clearances after determining that the operational efficiency outweighs the risk of a missed condition on the clearance. When a vertical clearance contains a constraint for starting the climb or descent, controllers should precede the conditional vertical clearance with LVLU-5 MAINTAIN (level) to first re-confirm the current level, e.g.,

Controller: LVLU-5 MAINTAIN [level]
LVLU-7 AT TIME [time 1] CLIMB TO [level]
LVLU-12 CLIMB TO REACH [level] BY [time 2]

FOR FLIGHT CREWS

To reduce potential errors when receiving conditional clearances, flight crews should ensure that:

- each flight crew member individually reads the uplinked clearances; and
- the augmented crew members receive appropriate briefings of the clearance.

4) SPECIFIC GUIDANCE TO FLIGHT CREWS ON HANDLING CPDLC MESSAGES

Confirmation bias may lead a flight crew to mistakenly follow the expected rather than the received clearance. Complex or conditional clearances can also contribute to this type of operational errors.

The following guidance for flight crews has been added to prevent such human errors when handling CPDLC messages.

- Both flight crew members should individually and silently read each CPDLC uplink message from the flight deck displays (including the uplink time stamp) and discuss prior to responding to and/or executing any clearance.

Reason: Reading the message aloud would bias the other flight crew member and could lead to the error of 'reading', what was read aloud as opposed to what was actually displayed. The procedure of reading a message individually and then conferring is critical to preventing errors due to pilot expectations, particularly with complex or conditional clearances.

- Each flight crew member should individually review a CPDLC downlink message before the message is sent in order to improve the situational awareness.

Reason: Having one pilot input the message and the other pilot review the message before it is sent provides an adequate level of situational awareness comparable to, or better than, voice communication.

- The flight crew members should coordinate uplink and downlink messages using the appropriate flight deck display, not the information from the flight deck printers.

Reason: The printers may not produce an exact copy of the displayed CPDLC messages with the required reliability.

5) THE USE OF STANDARD MESSAGE ELEMENTS BY BOTH FLIGHT CREWS AND CONTROLLERS

The use of standard message elements is recommended as it is intended to minimize the risk of input errors, misunderstandings and confusion between the flight crew and the controller. It also helps facilitate non-native English speaking data link users.

Additionally, the use of standard message elements allows the aircraft and ground systems to automatically process the information in the messages and thus controllers may take advantage of their ground system capabilities such as route conformance monitoring function, etc.