MID AIDC/OLDI Seminar

Basic SYSCO Principles and Standard OLDI Communication

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By the end of the Presentation you will have a:

• basic understanding of the need for exchange of data in Air Traffic Control (ATC);
• an overview of SYSCO standard co-ordination and basic transfer messages as they are used in most ATM systems;
• understanding of SYSCO terminology;
• definition of Standard OLDI message types;
• purpose of Standard OLDI messages;
• timing of the transmission of Standard OLDI messages;
• system responses to Standard OLDI messages.
What’s OLDI? 1

• Flights which are being provided with an ATC service are transferred from one ATC unit to the next in a manner designed to ensure complete safety.
• In order to accomplish this, it is a standard procedure that the passage of each flight across the boundary of the areas of responsibility of the two units is coordinated between them before the flight reaches the boundary.
• In OLDI, and in the ATM systems, we call this process the **Coordination Phase**.
What’s OLDI? 2

• After the receipt of coordination information, the receiving controller uses this information to provide view of the traffic in relation to other aircraft and airspace features.
• When the flight arrives at, or adjacent to, the boundary between the ATC units, control of the flight is transferred to the next unit.
• In OLDI, and in the ATM systems, we call this the **Transfer Phase**.
What’s OLDI?

- When carried out by telephone, the passing of data on individual flights is a major support task at ATC units.
- The operational use of connections between Flight Data Processing Systems (FDPS) at ACCs replaces such verbal “estimates”.
- This can be achieved using ICAO messages sent by AFTN. This process is supported by most ATM systems.
- AFTN messages allow for a limited flow of standard data between ATC units. The requirement for an increase in the data transfer requirements led to the development of On-Line Data Interchange (OLDI) within Europe in the early nineteen eighties.
What’s OLDI? 4

• In order to facilitate implementation, common rules and message formats were elaborated and agreed by the agencies concerned and incorporated in the EUROCONTROL Standard for On-Line Data Interchange.
• This process is also referred to as SYSCO (System Assisted Coordination).
• The OLDI standard is produced to support the continuing development of such facilities in compliance with the requirements of EATCHIP\(^1\).

\(^1\) EUROCONTROL ATC Harmonization and Integration Programme
SYSCO, brief description

• System Assisted Co-ordination (SYSCO) is a EUROCONTROL protocol for co-ordination and transfer between controllers.
• In the ATM systems the protocol is used between ATC centers and between ATC sectors.

• OLDI stands for: On Line Data Interchange.
OLDI Messages

• OLDI messages are exchanged between ATC units to provide for the exchange of co-ordination and transfer of control information.

• We will now look at the terminology used in most ATM systems during the co-ordination and transfer process.
SYSCO/OLDI Definitions

Co-ordination Entry/Exit Point (COP in/out)
- Is the agreed point, on or adjacent to the boundary between ATC areas of responsibility, used in a co-ordination sequence and referred to in co-ordination messages.
- In the ATM systems these points are qualified depending on whether they are viewed as an exit ‘COP in’ or entry ‘COP out’ point.

Transfer Flight Level (TFL)
- This is the level used in co-ordination messages as the level that the flight will be cleared to when transferring from one controller to another.
- In the ATM systems this level is qualified depending on whether it is viewed as the exit ‘XFL’ level or planned entry ‘PEL’ level.
SYSCO/OLDI Definitions

Cleared flight Level (CFL)
• Is the level that the pilot is currently instructed to fly at. It may be different to the TFL mentioned above, but should normally be the same as the TFL when the flight is handed over to the next controller.

Assigned Speed (ASP)
• Is the speed (indicated airspeed – IAS, or Mach number) that the pilot is currently instructed to fly at. It is used by controllers to maintain the required separation between flights.

Assigned Heading (AHDG) –
• Is the heading, in degrees magnetic, that the pilot is currently instructed to fly.
We will now look at the OLDI messages and their purpose.
OLDI Messages Definitions

**ABI**  
*Advance Boundary Information Message*  
- Initial notification and updates flight plan information

**ACT**  
*Activate Message*  
- Automatic update of FPL data with estimate information

**PAC**  
*Preliminary Activate Message*  
- Notification and pre-departure co-ordination where flight time to COP is too short for ACT message

**REV**  
*Revision Message*  
- To transmit revisions to co-ordination data (time, level, code, COP)

**LAM**  
*Logical Acknowledgement Message*  
- Automatically generated message by receiver to indicate receipt of transmitted message.
OLDI Messages Definitions

TIM         Transfer Initiation Message
• At the end of the co-ordination phase, to signify the change from Coordination to Transfer phase. Includes control data (CFL, AHDG, ASP)

SDM         Supplementary Data Message
• To transmit changes to control data during the Transfer Phase (updates TIM data)

COF         Change of Frequency Message
• Sent by transferring controller to indicate flight has been instructed to change frequency

MAS         Manual Assumption of Communications Message
• Message to the transferring unit to indicate two-way RTF contact has been established with the flight
Basic OLDI procedure.
Prior to FIR entry

- At a predefined number of minutes prior to the COP, an ABI is sent.

FIR (first sector)

Provides:
- Missing FPL data
- ABI + revisions
- SSR code to facilitate early correlation
What is sent in response?

• **LAM** is returned.

If the information sent in the ABI needs to be updated, it is achieved by sending another ABI message containing the revised data.
Prior to FIR entry

• At a predefined number of minutes or distance prior to the COP, an ACT is sent. (coord. phase)

Airspace (sector)

Provides:
- Coordination data
- Performs SSR code retention check
- code/callsign correlation

FIR boundary

SP time/distance

ACT
What is sent in response?

• **LAM** is returned.
What if the aircraft departs from too close to the COP to allow an ACT to be sent?
Close to FIR entry

- A PAC is used. A PAC replaces the ABI and/or ACT.

Airspace (sector)

Provides:
- notification or pre-departure coordination
- missing flight plan data

*Can contain a SSR code request*

ACT time/distance

PAC

FIR boundary
PAC Messages

If the information sent in the **PAC** message provides an update of ETD but does not include coordination data it is treated like an **ABI** on reception.

If the **PAC** message contains coordination data (COP, ETO and TFL) it is treated similar to an **ACT** on reception.
What if revisions to coordination are required?
Revision of coordination required

- A **REV** is used.

**Airspace (sector)**

Provides:

- Automatic notification of:
  - Code/RVSM change
  - Transfer level change
  - ETO at the COP change
  - Can also change route / COP
What is sent in response?

- **LAM** is returned and a FPL created if the sector responsible for the control of the flight can be identified.
Transfer of Communication and Control
Transfer initiation

- At a predefined **distance** or **time** prior to the COP, a **TIM** is sent. If distance and time are set to 0, **TIM** is not automatically sent.

**Airspace (sector)**

Signifies:
- end of coordination phase
- start of transfer phase
- forwards Executive Control data (AHDG, CFL, ASP) to the accepting controller
What is sent?

• Not before the flight has been coordinated.

• Automatically at a (SP) distance/time from **COP out**.

• When the above SP’s are set to ‘0’, the **TIM** is not automatically sent.

• Regardless of the SP, **TIM** message sending is also triggered when on certain controller actions that will be covered later.

• **A TIM** is acknowledged by a **LAM**.
Transfer initiation

- After the **TIM**, any changes to specific FDR fields result in a **SDM** being sent.

**SDM**

Airspace (sector)

Notifies changes for which approval is not required:
- CFL
- ASP
- AHDG
What is the last step?

• **COF** is sent.
Transfer Completion

- A **COF** is sent on controller ‘Transfer’ input (not an automatic function).

Airspace (sector)
- Manually initiated
- A TIM is also sent if COF sent before the automatic TI event or if SPs for TIM sending are set to ‘0’
What is sent in response?

• LAM is returned.
And finally...

- **MAS** may be manually initiated by the accepting controller.
- Not mandatory if a **COF** is used.
- Acknowledged by a **LAM**.
Transfer Completion

• A MAS is sent on controller ‘Assume’ input.
Standard OLDI Messages

**Notification Phase**
- ABI/PAC
- LAM

**Coordination Phase**
- ACT/PAC → LAM
- REV → LAM

**Transfer Phase**
- TIM → LAM
- SDM → LAM
- COF → LAM
- MAS → LAM

**Transfer Phase Coordination**
OLDI Message Reception

• Here is the process for handling OLDI messages.
OLDI Message Reception

On reception a syntax check is performed.

• If error, put in OLDI Queue for manual processing.

After syntax check a semantic check is performed.

• If error, put in OLDI Queue for manual processing.

In both cases LAM is not sent.

When no error, further processing takes place:

• LAM sent: associate with previous message or
• if no previous message, a warning is displayed.
OLDI Message Reception

No error - associated processing performed.

• **Successful** - Acknowledgement message sent.

• **Successful: ABI, PAC, ACT** - system tries to retrieve first controlling sector.
  
  • sector determined, acknowledgement message sent.
  
  • sector cannot be determined, message put in OLDI Queue, no acknowledgement message sent.

• **Unsuccessful** Other - put in OLDI Queue, no acknowledgement message sent.
That completes:

Basic SYSCO Principles and Standard OLDI Communication.
Thank You