NEXT GENERATION IULDUG SYSTEM White Paper

Abstract

The IULDUG has been in existence for about 50 years, around 10 in its current format. While the current system can be said to be adequate for its current purpose there are grounds to expand its capability to handle the exchange of ULD between all parties in the air cargo industry, not just airlines, while also taking advantage of some rapidly advancing new technologies.

Bob Rogers

Bob.rogers@uldcare.com

Table of contents

Executive Summary

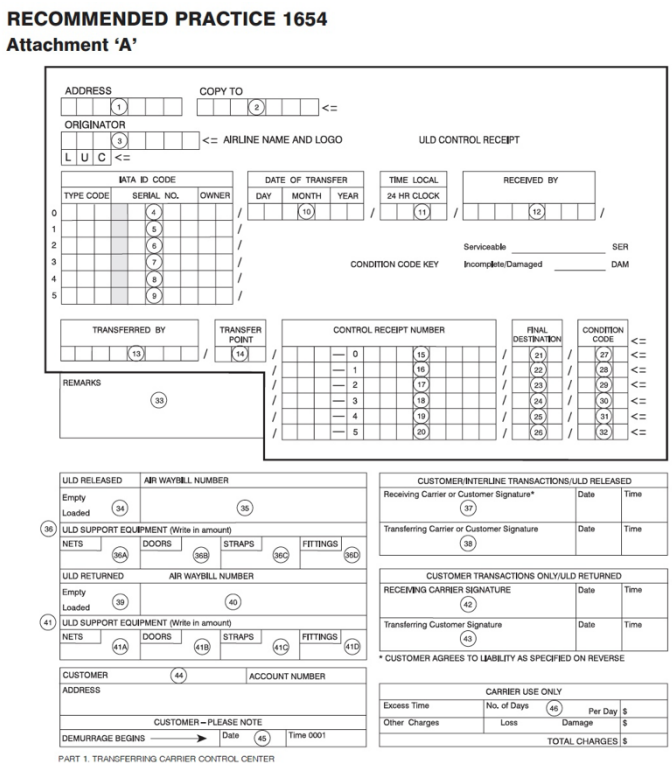
Background

The IULDUG system lies at the foundation of ULD CARE. First established in the early 1970s by a group of airlines seeking to establish an effective management tool to keep track of, and assign demurrage charges, of ULD assets being transferred between airlines as part of interlining. The system today continues to provide that same function, the need remains unchanged and the solution provided by the IULDUG system remains well suited to its purpose. Even during the extreme conditions of 2020, the IULDUG has been a useful resource for its member airlines.

However, during the intervening 50 odd years since the IULDUG came into existence the air cargo landscape has changed beyond all recognition, what was at that time a relatively small activity operating primarily within the boundaries of airports and with transfers between airlines has now expanded to a truly multimodal activity, ULD's can be found many many miles from airports and very often in the hands of non-airline parties such as forwarders and shippers.

This transformation in the air cargo environment has not been particularly supportive of ULD asset management, and has to a great extent resulted in a lack of control and accountability across the entire operational spectrum. On the other hand in the big picture of airline and air cargo handling ULD are always going to come somewhere near the bottom, and so the industry has had to make do with what they have.

A key component of recording any transfer of ULD between parties is the IATA ULD Control Receipt. Designed back in the 1970s this document, while being perfectly adequate for recording the details of the ULD's being transferred does not work for parties and locations outside airlines/airports as it uses SITA code naming conventions which are not applicable to non-airlines and off airport locations.



10 years ago, ULD CARE created a working group to address this issue, however due to the challenges involved in upgrading airlines legacy cargo/ULD management systems this initiative did not result in any changes to the existing practices.

The upside here is that the UCR remains a widely used industry standard today, and is unlikely to change in future, enabling a system to be built around the UCR.

On a different but related track ULD tagging started to see some interesting developments from about 2018. The potential benefits of some kind of technology driven solutions for reporting the location of a ULD are undeniable, the use of RFID for ULD tracking had been long talked about but achieved very little in the way of application however BLE tagging and other IOT solutions started to show some interesting new possibilities in terms of locating the whereabouts of individual ULD.

However, while these technologies can identify the location of specific ULD is they do not solve the problem of recording the transfer, and change of responsibility for, the ULD asset between two parties, a function that is basic to any business process where assets are exchanged between two parties.

The IULDUG's uniquely deliverable functionality

Across the industry the IULDUG is often misunderstood to be just another ULD control system, a competitor to the various commercially available or in house systems used by airline to manage their ULD assets. This is not at all correct, as the IULDUG performs 2 functions that cannot be handled by an airline's in house system, while it does not perform any of the typical stock management functions found in an airline's in house system.

Why is this? The IULDUG was set up in the 1970's to support airlines whose ULD assets were temporarily transferred into another airline's operation in the process of interlining. While clearly such transfers provide an efficient mechanism for both airlines to process an interlining transaction, it is important that both parties have visibility of such transactions and that both parties understand and agree to the financial obligations should the ULD be returned late or not at all.

The IULDUG provides two unique functions, taking for example Airline A who transfers a PMC to Airline B

Demurrage calculations

a. The unique deliverable of the IULDUG system is its demurrage calculation and display function. Why is demurrage so important? Human nature being the way it is there is almost always a need for a financial incentive/penalty to encourage on time activity, whether it's the fine for a late return library book or video rental, a ticket for overstaying a parking meter, or a penalty for late payment of tax. And coming closer to home the shipping industry has a system of detention and demurrage fees for late collection and/or late return of shipping containers I(https://fiata.com/fileadmin/user_upload/documents/recent_views/MTI/FIATA_World_Congress_2018_-_Presentation_New_Working_Group_Sea_-Best_Practice_Guide_on_demurrage_and_detention-.pdf) . It might seem at a first glance that surely airlines are responsible parties and will always return each other's ULD on schedule, but that is not the case. Even though there is the free 5 day allowance before the demurrage clock

starts running in 2019, the total accrued demurrage between all members of the IULDUG exceeded US$ 1.1 million, a very significant sum. No doubt not all of this was invoiced, as some airlines agree to waive demurrage charges, and of course these charges nett out to zero within the IULDUG membership, there is no gain or loss for ULD CARE, but the clear point is that in the absence of the demurrage system airlines would struggle to recover the use of their ULD assets that have been interlined to another carrier, incurring significant financial losses.

b. Of course two airlines wishing to conduct interlining between themselves can always set up a bilateral agreement covering the processes and demurrage rates, but to do so with multiple airlines is a time consuming exercise .A foundation of the IULDUG community is the commonly established demurrage and non-return charges. These charges which can be seen at https://www.uldcare.com/wp-content/uploads/2019/03/Demurrage-Charge-Table.pdf are the basis for payments by airlines who hold a foreign ULD for longer than the 5 free days. Using the 2 airline example again, Airline A transfers a PMC to Airline B and the transfer is entered into the system. Airline B fails to return the PMC to Airline A until 11 days have passed. The system will calculate the demurrage as follows $ 8.40 *(11-5) = $ 50.4. Had Airline B failed to return the unit for 30 days then the formula will be $8.40 * (30-5) = $ 210. After 180 days if Airline B has not returned the PMC, then it is termed a “non-return” which is actually 180 days @ the daily rate of $ 8.40. or $ 1512

   From an administrative point of view this is a very effective system:

   1.Demurrage rates are established; it is not necessary for Airline A and Airline B to conduct a bilateral discussion.

   2.Invoicing is straightforward, once the PMC is returned from B to A the total demurrage for that particular exchange will appear both in Airline A’s demurrage receivable report and Airline B’s demurrage payable report, visible to both. Airline A can then invoice Airline B (generally via the IATA clearing house) using the demurrage receivable report from the IULDUG system as the documentary evidence of the money due. Airline B can see the calculations in the system as a basis for agreeing to settle the invoice.

   There is no basis for disagreement as the entire process has been conducted in an open and transparent manner.

b. The system provides visibility to both parties of the transfer, date, time, location, condition and some special codes on the same neutral system. Obviously, Airline A cannot see the data on Airline B’s system and vice versa Airline B cannot see into Airline A’s system. By having the record of transfer in the IULDUG both parties have the visibility of the same data.

c. It is important to realise that while a typical airline ULD management system can generally keep track of a foreign unit that has come into its system it can never provide the visibility to both carriers, which means that in our example Airline A,

without the IULDUG, would have to resort to emailing Airline B for information about its unit, while with the IULDUG Airline A has visibility of its unit being in Airline B (or possibly if a further transfer has taken place in a third airline) system.

With its common visibility to both parties involved in an interline transaction and its commonly accepted demurrage computations and reporting the IULDUG fulfils a unique role in global ULD operations.

Recent developments

In early 2018 ULD CARE started to become aware of the potential to use Blockchain as an operating platform for an upgraded version of the current IULDUG. It was believed at the time that a Blockchain-based platform could both replicate and enhance the current IULDUG system. At that time most discussions around Blockchain centred on cryptocurrencies but there were some signs of developments in the area of logistics which encouraged ULD CARE to explore further, and by the middle of 2018 we were privileged to see a demonstration by an airline of a prototype Blockchain-based system for managing ULD transfers between non-airline parties. Encouraged by this demonstration we started to explore potential suppliers and after a fairly lengthy process ended up entering into an agreement with SITA to carry out a POC involving the creation of a Blockchain based system that mimicked the functions of the current IULDUG system.
We were assisted in the POC by four airlines NZ, CX, EK and LH, and during a two month active operation both genuine and dummy transactions were processed through the system in order to test the use of Blockchain in performing the various functions of the IULDUG including the all-important demurrage calculations.
The POC was successfully concluded towards the end of 2020 and a report finalised in Q1 of 2021.

Development of the IULDUG system to be able to accommodate nonairline participants is clearly a high priority. Simultaneously there is also a pressing need to be able to digitalise the current paper-based UCR in a standardised manner, at a time when increasingly transactions are carried out on the touchscreen of a handheld device, to have ULD transfers still stuck in the paper era is clearly inappropriate.
While initially it was believed that ULD CARE would need to develop such handheld apps in fact during the past 12 months it has become apparent that there are third parties interested in providing this function along with other functionality such as capturing photographic images of any ULD being transferred.

Current status

1. IULDUG system. Due to internal reprioritisations SITA has decided not to progress projects involving cargo and therefore the IULDUG project. While on the surface this

might seem to be a bad outcome it is actually not so bad at all, the actual code for the POC was created by a US based contractor to SITA, “Sky Republic” (https://skyrepublic.com) who have considerable Blockchain expertise and in fact who are keen to progress the project outside of the SITA envelope. A number of discussions have been held with Sky Republic and the ball is now in our court to take next steps.
At the same time one valuable outcome from the POC is that we are now much more able to design a scope for the next generation IULDUG, and while this involves adding some functionality is it can also actually include reducing the number of different reports which are becoming obsolete. Therefore, the actual creation of a new system does not present any major programming challenges.
One of the challenges in implementing any new IT system is changing entrenched business practices. We believe this risk is avoidable as initially a new IULDUG would function in the same manner as the existing system it replaces, but would allow users to take advantage of the new functions it offers. Furthermore, the customer base would be unchanged for the traditional airline to airline transfers, and it would be up to the individual member users of the IULDUG system to bring their forwarder community into the system.

2. Paperless UCR. At this stage it has not been necessary for ULD CARE to try to develop some kind of handheld app, instead we have been able to rely on one of the potential developers of such apps, Virtual Control. VC is on the brink of releasing both iOS and Android apps that will enable users to not only create a digital UCR but also add other features such as capturing photographic images of the ULD being transferred. ULD CARE has entered into an agreement with VC whereby this app will be available free of cost to ULD CARE members during the second half of 2021. At this stage we will not attempt to integrate with airlines internal IT systems, as that would be too time-consuming so at this stage the app will simply send an email facsimile of the LUC/MUC and later on of the UCR to the main office.
   We have actually conducted tests using the app to send data to the IULDUG system to report an interline transfer via a MUC message, and this worked perfectly well.

Section Summary

Money talks and it's an inescapable truth that most of the time it takes financial incentives and/or penalties to spur a particular action. It is this basic principle that was behind the creation of the IULDUG about 50 years ago, and it remains unchanged today, penalties in the form of demurrage are a fair and necessary method of ensuring the prompt return of ULD assets to their rightful owners.
And, while the IULDUG has successfully provided such a platform for transfers within the airline community, the industry has evolved, countless ULD’s are transferred daily into non airline entities such as cargo terminals and forwarders, off the “radar” of their owner airlines.
Expanding the ability to charge these parties for demurrage (as is a common practice in the ocean freight industry) seems an obvious ambition, and while individual airlines could create such programs on a local basis only an organisation such as ULD CARE can create a globally trusted organisation to implement a truly industry wide ULD demurrage program.

Background and History and Recent developments of the IULDUG system.

1. Early Days
    a. The foundation of the IULDUG system goes back to the 1970s when a number of airlines who had started opening an operating ULD recognised that there should be some kind of system to keep track of their ULD assets when they transferred into another carrier in the course of cargo into lining activities. Operating as a special interest group under the auspices of IATA these early airlines set about creating a set of rules and governance under which such transfers of assets could take place, this was published as the IATA ULD Control Manual.
    b. With governance established the next step was to establish an operating system, and those pre-PC days this was done on the IATA main frame in Montréal which would receive MUC messages via the SITA system, and print out on a weekly and monthly basis paper reports which were sent to all the member airlines.
    c. With the system established and as the number of ULD operating airlines continued to expand more and more airlines joined the IULDUG, and at the same time as the community gained experience the operating procedures in the UCM were enhanced.
    d. About 15 years ago the concept of a mainframe-based system delivering paper reports was clearly becoming outdated and the IULDUG membership decided to upgrade the system to its current version which essentially is a web server based system providing on-screen reports to users, however still reliant on the same basic MUC data for its input.

2. Today's scenario.
    a. Over the past 50 years somethings have changed and other things have stayed exactly the same:
        i. What has changed?
            1. Back in the 1970s the concept of off airport ULD operations was pretty well unknown, ULD stayed on airport and pretty well the only transfer was with other airlines. Furthermore, the majority of ground handling and cargo operations were still airline operations. This scenario has now been completely transformed, the largest number of ULD transfers take place between non-airline entities such as independent cargo terminals and transport companies/freight forwarders/shippers.
            2. There are also far more ULD in circulation today, and it is important to recognise the economic and safety factors associated with the transfer of ULD assets between various different parties.
        ii. What has not changed?
            1. There is a huge positive here in that the IATA ULD identification system is basically unchanged, it has added an additional digit in the unit serial number field giving five digits

and there may be necessity to make more such changes in future but basically the ID System has stood the test of time and is adopted on a global basis. If this had not been the case the IULDUG system would be a far more complex function.

2. Also unchanged is the IATA ULD control receipt or UCR. The basic data associated with the transfer of a ULD asset between two parties is the same today as it was back in the 1970s, and this stability has supported the functionality of the IULDUG system and indeed is a good platform for the next developments.

3. The E-UCR Project.
    a. At the 2012 annual ULD CARE meeting a task force was set up to work on creating enhancements to the UCR that would enable it to be expanded beyond just airline to airline transfers. Primarily this meant moving away from the SITA code ID system to having real world names and addresses.
    b. The group identified two objectives
        I. the creation of an improved UCR with the accompanying IATA standards
        II. developing standards for an electronic UCR.
    c. Over the subsequent years a proposal was submitted to IATA ULD Board which was ultimately acted upon by the IATA XML group who published a schema. However, this never gained sufficient popularity across the industry due in no small part to the costs associated with modifying the cargo/ULD systems from vendors such as Unisys, IBS and Champ.
    d. At that point things came to a halt and remain unchanged today.

4. BLE, Blockchain and other technologies
    a. Around 2017 ULD CARE started to become aware of the introduction of BLE tagging of ULD, with the first initiatives coming from NZ. While this did not have a direct effect on the operation of the IULDUG it was certainly of interest to the ULD CARE community at large.
    b. During 2018 we also started to become aware of Blockchain, which although was primarily talked about in terms of cyber currencies at the time was also starting to show capabilities in asset management with projects like the IBM/Maersk shipping documentation management Blockchain project. Over a few months' conversations were initiated with a number of subject matter experts and also airlines and later in the year ULD CARE was invited to view a POC of a ULD control Blockchain set up by Cathay Pacific.
    c. By this stage it was becoming clear that Blockchain could be a very effective tool for managing ULD transactions and we started to look for possible

system suppliers. During 2019 discussions intensified with a couple of potential suppliers and finally lead to the collaboration with SITA on a POC for a Blockchain equivalent system to the current IULDUG.

d. The POC went live in Q4 2020 working with four airlines, NZ, CX, EK and LH and over a two-month period was tested with a variety of both real and dummy transactions, the outcome of which was that such a system could indeed provide the same functionality as the current IULDUG and at the same time could provide some of the enhancements we were looking for such as moving away from strictly SITA code names and addresses.
e. While this was going on there was also a more general development occurring in areas such as development of smart phone apps and digital transaction processing, all of which seemed to have some applicability to being able to capture ULD transfer information digitally at the point of transfer.

5. The Blockchain POC
    a. As stated above the Blockchain POC project was initiated with SITA in order to prove that a Blockchain platform could indeed mimic the function of the current IULDUG and also to identify areas where such a system could be improved over the current IULDUG.
    b. The program has referenced the ULD control manual and the current system in creating the POC, at the same time adding the ability to have transfers between non-airline participants and also a couple of other minor enhancements.
    c. It was possible to make direct entries into the POC, identical to the online entry function in the IULDUG, while an API was established to transfer a replica of a section of the data in the current IULDUG into the POC
    d. The four participants were NZ, CX, EK and LH. These four parties could see all transactions relating to their own ULD regardless of the receiving/transferring carrier, which enabled comparison of the demurrage calculation in the current system against the calculations in the POC.
    e. A number of dummy transactions were also carried out involving transfers through non-airline participants.

Functions of the Current IULDUG System:

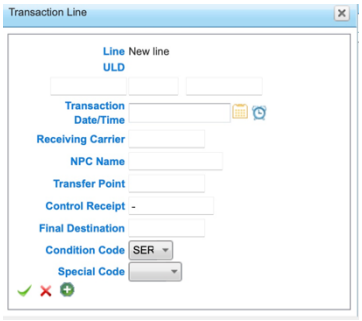
The basic function of the IULDUG system is to receive inputted data via the formatted MUC message, and provided that the data complies with the system check, to then enter the data into the database for processing and display to the various reports (lists). Once in the database each transaction entry will provide an updated readout of the accumulated demurrage until a subsequent MUC message recording the transfer of the unit back to the owner airline closes the sequence at which point the "clock" stops.
This information is available on both live and weekly lists, and enable both receiving and transferring carriers to keep track of the disposition of their own units and of foreign units in their system and most importantly to track the accumulating demurrage payable on any particular unit.

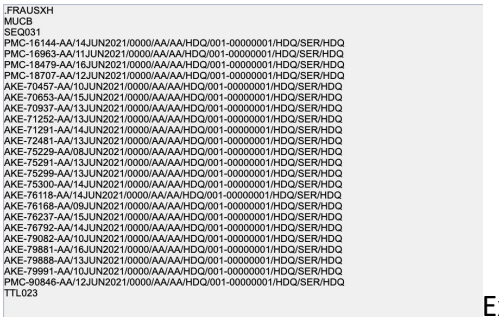
Various other reports display summaries of the total demurrage receivable and the total demurrage payable, in real time, weekly and monthly lists.

The reports in the system are for viewing on screen and also may be exported through PDF or XLS. The current system has no ability to automatically export data however it is worthwhile to note that for the purpose of the POC an API was set up that exported from the current system to the POC which at least demonstrates the ability of using APIs to export data.

There are three methods of entering the data into the system:

a. An online entry system for individual transactions, whereby a single entry can be entered and authenticated in real time.
b. A transpose function where multiple entries that have been prepared elsewhere such as on another system can be copied and pasted into the IULDUG
c. By email transmission of a formatted MUC message from an airline's own system to the IULDUG.



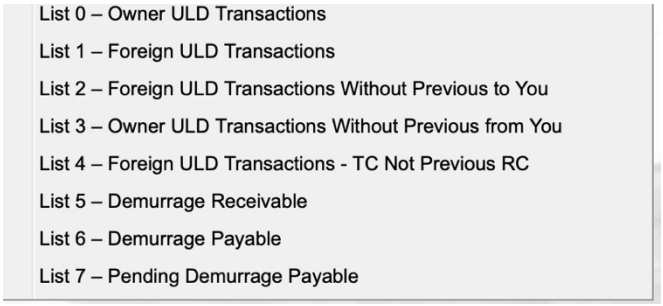

.FRAUSXH
MUCB
SEQ031
PMC-16144-AA/14JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
PMC-16963-AA/11JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
PMC-18479-AA/16JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
PMC-18707-AA/12JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-70457-AA/10JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-70653-AA/15JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-70937-AA/13JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-71252-AA/13JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-71291-AA/14JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-72481-AA/13JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-75229-AA/08JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-75291-AA/13JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-75299-AA/13JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-75300-AA/14JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-76118-AA/14JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-76168-AA/09JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-76237-AA/15JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-76792-AA/14JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-79082-AA/10JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-79881-AA/16JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-79888-AA/13JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
AKE-79991-AA/10JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
PMC-80846-AA/12JUN2021/0000/AA/AA/HDQ/001-00000001/HDQ/SER/HDQ
TTL023

Example of a typical MUC message.

Reports (Lists).

1. Reports are in 3 categories, Real Time, Weekly and Monthly. The original system which produced paper reports had only weekly and monthly reports, the current system did not deviate from this set up but added the Real Time functionality.

a. Real Time Lists

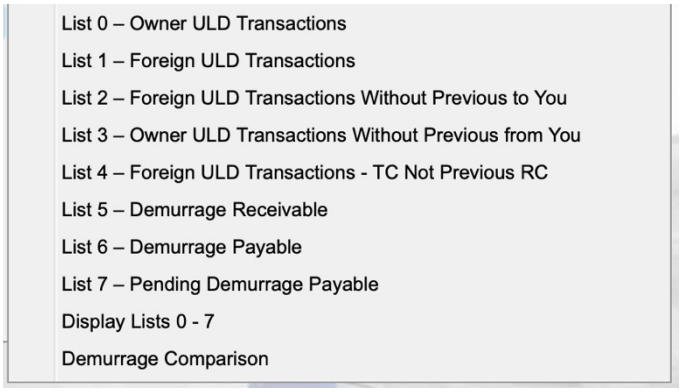


List 0. Owner ULD transactions shows all current transactions of the airline who is using the system.
List 1. Foreign ULD transactions shows all foreign units in the user's system
Lists 2, 3 and 4 show units with unmatched transactions, if and when a corresponding transaction for one of these units is entered then the transaction will move to list 0 or 1.

It is important to recognise is that Lists 2,3 and 4 are only required due to the poor quality of the reporting of transfers via MUC's, which is why it is so critical to develop a digital UCR and move away from paper systems which will simplify the operation of the IULDUG.

Lists 5,6, and 7 all refer to demurrage.

b. Weekly Reports

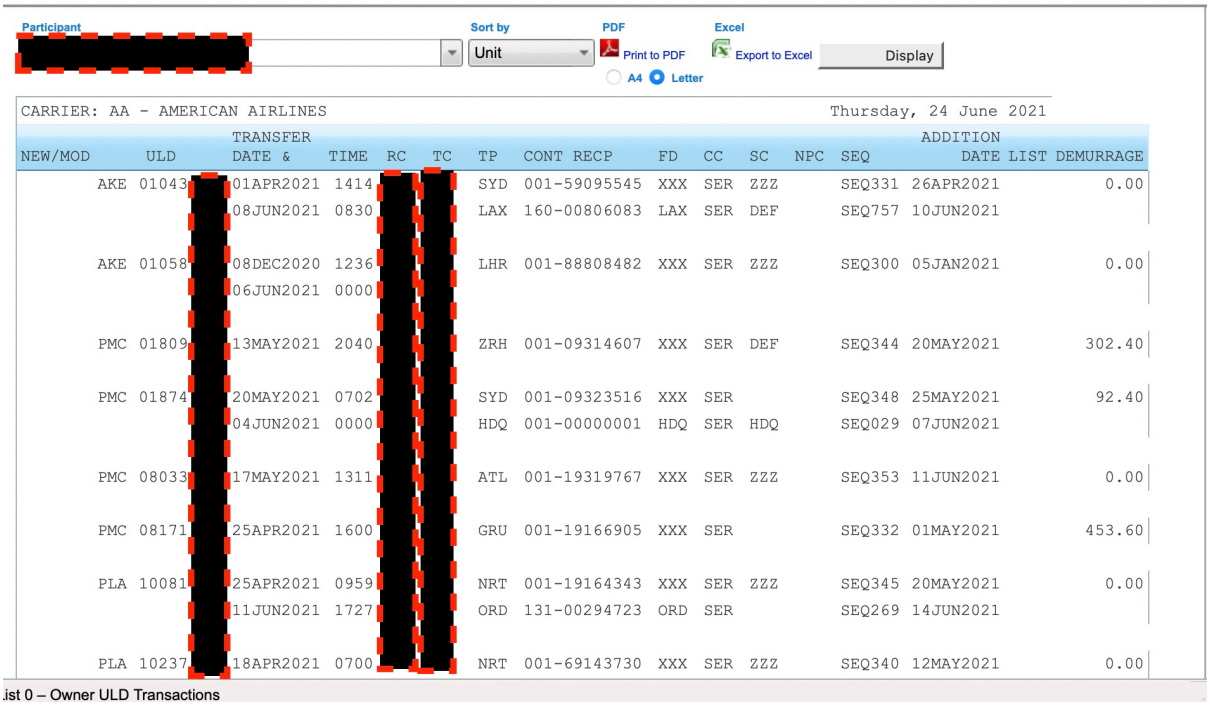


The weekly lists (and remember in the mainframe system there were no Real Time lists) are generated at 0001 UTC every Thursday and provide a "snapshot" of the status at that moment. Every week is saved in the system, so users can go back months and even years if they wish.

c. Monthly Reports

Monthly reports are generated at the end of each month and provide a summary of both owner and foreign unit transactions as well as a summary of transaction fee accrued (each member pays $ 1.50 per transaction) and various demurrage reports used for financial settlement with other members. Like weekly reports monthly reports can be view back for every month back to the inception of the system in 2009.

d. Lists/reports all follow a similar layout as shown here (for confidentiality the carriers names are blacked out)



Working from the left:

1. A * indicates a new or changed entry
2. The ULD ID code
3. Date of transfer
4. Time of transfer
5. RC (Receiving carrier)
6. TC (Transferring carrier)
7. Transfer point
8. UCR #
9. Final Destination (optional)
10. Condition code (Serviceable, damaged, unserviceable)
11. Special Code (eg ZZZ, HDQ etc)
12. System sequence #
13. Date the record was added to the system
14. Current accrued demurrage total

As mentioned earlier the current system basically replicated the weekly and monthly reports from the main frame system and added a real time report. It is likely that the weekly reports are now redundant, in which case the system could become quite similar to a banking function, with “real time” reports equivalent to a typical on-line banking view of an account, going back maybe 180 days, and monthly statements, showing an end of month summary.

Demurrage:

While one function of the IULDUG system is to provide users with the visibility of their transferred units an equally important function is that the system calculates and displays

the current accrued demurrage owed or owing on any particular unit transaction at any particular time. Demurrage can of course be a contentious issue, but in the case of the IULDUG it is a long-established principle that is accepted by all the members.
ULD CARE its self plays no part in the financial transactions and derives no financial benefit from the demurrage process, members settle their demurrage with each other, generally through the IATA clearinghouse, there is no direct billing output from the IULDUG system.
An important aspect of the IULDUG is that by joining the IULDUG airlines agree to be bound by the demurrage and non-return rates and to honour the obligation to pay to other members any charges as calculated by the IULDUG system without dispute.

Other IULDUG functions.

TYPE	ULD	TRANSFER DATE	RC	NPC	TC	DEMURRAGE	TP	FD	CC	SC
AKE	AKE 01043 AA	01Apr2021 03:14	CX		AA	0.00	SYD	XXX	SER	ZZZ
AKE	AKE 01043 AA	08Jun2021 15:30	AA		CX	0.00	LAX	LAX	SER	DEF
AKE	AKE 01058 AA	06Jun2021 12:36	**		CX	0.00	HDQ	HDQ		
AKE	AKE 70022 AA	10May2021 12:29	AA		JL	0.00	LHR	LHR	SER	
AKE	AKE 70028 AA	01Jun2021 00:42	AA		JL	0.00	PEK	XXX	SER	
AKE	AKE 70030 AA	29Apr2021 00:42	AA		JL	0.00	NRT	XXX	SER	ZZZ
AKE	AKE 70117 AA	05Mar2021 00:00	AA		AA	0.00	HDQ	HDQ	SER	HDQ
AKE	AKE 70150 AA	20Jun2021 09:15	**		KL	0.00	HDQ	HDQ		
AKE	AKE 70281 AA	14Apr2021 01:19	DL		AA	0.00	SYD	XXX	SER	ZZZ
AKE	AKE 70359 AA	29Apr2021 00:42	AA		JL	0.00	NRT	XXX	SER	ZZZ
AKE	AKE 70366 AA	14Apr2021 04:31	DL		AA	0.00	SYD	XXX	SER	ZZZ
AKE	AKE 70372 AA	27Apr2021 00:00	AA		AA	0.00	HDQ	HDQ	SER	HDQ
AKE	AKE 70385 AA	23Mar2021 07:50	AA		JL	0.00	HND	HND	SER	ZZZ
AKE	AKE 70385 AA	23Mar2021 13:56	AA		JL	0.00	HND	HND	SER	
AKE	AKE 70457 AA	10Apr2021 04:30	DL		AA	0.00	SYD	XXX	SER	ZZZ
AKE	AKE 70457 AA	10Jun2021 00:00	AA		AA	0.00	HDQ	HDQ	SER	HDQ
AKE	AKE 70497 AA	12Apr2021 05:31	EK		AA	0.00	SYD	XXX	SER	ZZZ
AKE	AKE 70497 AA	02Jun2021 00:00	AA		AA	0.00	HDQ	HDQ	SER	HDQ
AKE	AKE 70537 AA	10Apr2021 04:30	DL		AA	0.00	SYD	XXX	SER	ZZZ

a. A “ULD Movement” function that enables users to search for/track “transaction chains” on any particular unit.

b. Lost and Found. The system includes an online database where airlines can record any lost units which will then become visible to other users.
c. A complete list of participant contacts, enabling any member to locate the contact details of other members
d. A report showing the transaction counts for each member to facilitate billing by ULD CARE
e. A banner display function for the system administration to post a message one or multiple members who will see this on login
f. All the usual system administration functions including password management, system access rights etc.

Upsides of the current system:

a. After many years of operation, the current system is extremely stable, there are very rarely any kind of technical glitches.

b. Also, after many years of operation for those IULDUG members who are familiar with the system it is rather easy to navigate, it is also supported by a comprehensive user manual.
c. The IULDUG remains the **only** system which can offer independent visibility in one system to both parties involved in a ULD transfer transaction, both the transfer and carrier and the receiving carrier have complete visibility as long as a correct MUC was established. This functionality is critical where there are financial obligations (demurrage) in case of late returns.
   The system will automatically reject and send back to its creator any non-compliant MUC message, and as a final "check" the system has a " Change request" function that enables a transparent resolution of any disputes between the 2 parties.
d. Furthermore, the independent not for profit status of ULD CARE and the IULDUG ensures its neutrality to all users.
e. Membership of the IULDUG implies acceptance of the standard published rates of the demurrage and non-return, and the implied obligation to pay demurrage as shown by the system to counter party member without debate.

Downsides of the current system:

a. The software code on which the current system is based is reaching the end of its life, which could become critical if software patches for the underlying database program become no longer supported.
b. The system is over reliant on human interaction
    a. Some users have integrated the creation of MUC messages by their in house ULD control systems, making it little more than a key stroke to send a MUC, others rely heavily on manual inputs of MUC's through the "on line" or transpose input functions. This is clearly not particularly efficient and also leads to retraining problems when staff movement occurs.
    b. The system output functions are no more than screen lists which may be exported as PDF or XLS, requiring human intervention and interpretation. Again, in the hands of an experienced operator this is not a huge issue but when staff change, as happens very regularly these days, it's quite a challenge for a new person to get to grips with the system functionality.
c. And in the same scene there is no capability for the system to interact digitally with the airlines in-house ULD management systems, one example of this weakness is when the return of a unit to the owner carrier is not entered into the system and requires manual intervention to create a dummy return.
d. Probably the biggest downside of the current system is that it is reliant upon data captured at the point of physical transfer of the ULD that will not necessarily be accurate or timely. There are a number of causes here:
    a. Lack of an understanding at the ground handling level of the need to create a record of the transfer of the ULD to another party.
    b. Reliance on paper-based records for transactions with only a limited number of digital processes created by individual airlines and handlers.

c. Lengthy “chain” for the transfer record to get to being a MUC message in the IULDUG system, requiring the transfer of the data between a number of parties.
d. Mainly as a result of (c) above the system suffers from a high frequency of unmatched transactions, either a unit that has been transferred out correctly but which there is no return transaction even though the unit is now back in its owners’ fleet, or alternatively a unit that shows a return transaction without an earlier “out” transaction. While the system can and does handle such “orphan” transactions this requires a lot of operator input which could be eliminated if timely and accurate data collection at the point of transfer was to become an industry normal.

Section Summary

Clearly, having operated for 50 years the current IULDUG system delivers value. At the same time there are both needs and opportunities to take the system further, providing greater functionality to a wider range of users, delivering improved efficiency to ULD operations.

Ambitions for the next generation IULDUG.

1. For over 10 years ULD CARE as had the ambition to facilitate a far more comprehensive and efficient method of tracking the transfer of ULD assets between multiple parties. The current IULDUG provides a well proven system for tracking transfers between airlines, establishing the basic principles necessary such as the UCR, reports and demurrage calculations. It therefore seems quite logical to expand the capability of the current system so that it can be applied to all parties whose business brings them into contact with ULD.

2. Furthermore, with very few exceptions airlines struggle to control the management of those ULD assets that move off airport, both from a logistics point of view and also from the point of view of being able to use demurrage as a "stick" to encourage fast return of their assets. It is worthwhile noting that FIATA has published a white paper on the subject in relationship to sea containers, endorsing the right of the shipping companies to extract charges for late return of their assets, so why should ULD be an exception? The full report can be viewed at https://fiata.com/fileadmin/user_upload/documents/recent_views/MTI/FIATA_World_Congress_2018_-_Presentation_New_Working_Group_Sea_-_Best_Practice_Guide_on_demurrage_and_detention-.pdf while the executive summary states:

> **EXECUTIVE SUMMARY**
>
> Demurrage and detention charges are an important tool for shipping lines to ensure the efficient use of their container stock which represents a substantial investment. For shipping lines, it is essential to turn around their containers as fast as possible, consequently merchants who use containers for longer periods should be discouraged from this practice.

   For "shipping lines" read " airlines" , and this fits exactly with ULD CARE's position.

   Additionally, Air New Zealand has for some years operated a system in Auckland for charging forwarders for late return of ULD an example of what can be done, living proof that demurrage systems for off airport ULD can be both practical and effective.

3. In addition to being able to incentivise/penalised off airport operators to return ULD's quickly a new system would be able to provide accurate, real-time information directly to the screens of ULD management teams around the world.

4. ULD CARE can leverage the longstanding reputation of the IULDUG as a neutral platform for recording ULD transfers, by developing a new system that continues to

offer the same functionality as the existing IULDUG but expands its accessibility to all players in the air cargo environment while adding improved operational efficiencies.

5. If the experience of the last few years is anything to go by developments in technology are going to be coming thick and fast, therefore building a system that is not only making good use of today's technology but will be able to benefit from new technologies in the next decade is a worthwhile ambition.

6. Until now the IULDUG has never been integrated with payment systems such as the IATA clearinghouse. This approach requires airlines to run off reports from the IULDUUG system at the end of each month and pass them to their accounts department for enter through the IATA clearinghouse. Given the ambition to expand the user base to include freight forwarders and the significant additional paperwork but that would entail it would seem a very worthwhile ambition to be able to integrate the demurrage side of IULDUG with platforms such as the IATA clearing house or Paycargo (https://paycargo.com).

7. One of the growing challenges in ULD management is the correct handling of rental/Asset management ULD, particularly pallets. Due to the physical difficulty of remarking the ID codes on pallets when renting to different customers it has always been a challenge to cargo terminals to identify the current "owner" of any such pallet once the cargo has been unloaded. This situation used to be relatively small as there were a limited number of these rental pallets in circulation, but in recent years we see very significantly increasing numbers of "pooled" pallets such as those operated by Unilode. These pallets present a problem to airlines when they are interlined, as the receiving carrier (RC) has no easy way of knowing to which airline the pallet should be returned. It would seem quite achievable to set up a means to communicate via API's between the different systems so that there is "ownership visibility" for these "non-airline specific" ULD.

Section Summary

To migrate the current, aging, IULDUG system to a new platform, maintaining the current system functions and user experience while expanding the user base to include all parties in the air cargo industry and digitizing the input and output of the system, improving efficiency and delivering benefits to the ULD owning community.

How would the new system differ from the existing IULDUG?

In many respects the answer to this question is not very much, the functionality of the system will remain unchanged, as it has done for 50+ years and this removes a great deal of risk.

What will change?

There are a number of enhancements that will rejuvenate the system increasing its attractiveness to the members of the IULDUG and future proofing it for maybe a further 20 years.

a. One of the key motivations behind this project is to have a system that will be able to handle transactions between nonairline parties. This has been on the ULD CARE wish list for 10 years, but was difficult to achieve due to the inflexibility of legacy systems when it comes to handling naming and location protocols outside the SITA system. A key functionality of the new system will be its ability to handle any kind of naming format.
b. In extending the functionality of the system to include nonairline parties including specifically freight forwarders the system needs to be extremely transparent if we are to avoid endless arguments from freight forwarder over demurrage charges. This is where Blockchain comes into the equation as this platform is known for its immutability, once data is entered it cannot be modified by anyone.
c. Data import and export.
    a. Data Import: The original IULDUG system was set up to receive data via MUC messages over the SITA system. Today the same format MUC messages are transmitted by email to the system. The changes here would be
        i. The system would accept names of the receiving and transferring parties outside the traditional SITA format.
        ii. The transfer location could be a non-airport location e.g. a street address.
    b. Data Export: The current system can export the various reports in .XLS and .PDF format, but nothing beyond that. There are a number of opportunities for improvement here:
        i. Ability to use API's to automatically share data between the IULDUG system and the airlines in house ULD management system.
        ii. Ability to have the system automatically invoice for demurrage through the IATA clearing house and/or other payment platforms.

What will stay the same?

a. At the top of this list has to be that the business process and user experience will remain unchanged. The proposed system will look and feel extremely similar to

the existing IULDUG, accepting identical input messages and providing identical output screens.

b. Deliverables, the calculation and presentation of demurrage receivable and payable, remain unchanged.
c. The underlying principles of the IULDUG agreement by which all members of the system remain unchanged.

Section Summary

The proposed new system will retain all the functions and user experience of the existing system while expanding the potential user base and improving digital connectivity.

Technology Opportunities

After many years of having virtually zero in the way of technology opportunities all of a sudden, we find ourselves with a range of choices that not only appear to be applicable but also affordable. This is quite a turn of events, on one hand offering significant opportunities but also on the other hand giving us the challenge of making the right choices.

Key technologies:

a. Blockchain.
   Block chain first appeared as a tool for managing crypto currency transactions, and it is relatively recently that it's applicability to supply chain and logistics management has come into the forefront, and in fact is now the largest application of block chain technology. And we can draw on the experience of Cathay Pacific who has built a ULD management system using Blockchain, now operating for over 12 months.
   Why Blockchain? The primary attraction of Blockchain is its immutability, once a record has been entered it cannot be deleted or modified. This is important when the system is being used to track transfers and record demurrage a process which involves at least two parties with one receiving and one paying demurrage, a situation that requires a completely trustworthy platform.

b. API's
   The current system accepts inputs (MUC's) from user's systems (as well as allowing on line entries) but when it comes to data output it is very basic, only offering one screen reports plus .PDF and .XLS exports. API's (Application Programming Interface) is a very widespread method for communicating between different systems today, opening the door for seamless communication between the IULDUG and owner's systems, for example to manage the situation when a unit shows up in the owners fleet without a recorded return in the IULDUG.

c. Hand Held devices.
   Hand Held Devices need no introduction, they are becoming ever more a part of daily life, a trend that can be expected to continue at a rapid pace. Given that ULD transfers take place in the field, not in some nice office, recording the transfer of ULD assets on such a device seems an obvious choice. Additionally, as well as recording the basic UCR data such apps can also record additional data such as a photo of the ULD condition, or its ULD Tag, while such information is not required by the IULDUG this can be useful for other parties in the ULD chain.

d. Digital ULD tags
   ULD tagging has been around for over 3 years now and is steadily gaining in popularity. While this technology does a great job of identifying the physical location of the tagged ULD it does not create a record of transfers between parties. So, while the 2 functions of the IULDUG and Tagging could appear to overlap in fact this is not the case. However, there are opportunities for certain synergies between the systems, for example using a BLE tag to communicate with a handheld device to provide the ULD ID data directly.

Section Summary

After many years with very limited technology opportunities, we now find ourselves with a number of new technologies appearing which can be taken advantage of.

Commercial Implications

1. Financing of the required investment.
    a. At the current time we are not in possession of any kind of budgetary estimates as to how much the system will cost.
    b. ULD CARE has built up a reasonable level of financial reserves over the last few years, a part of which would be available for use in financing a new system.
    c. There is the potential to request additional contribution from airline members for development of the system, given that we have approximately 50 users it should not be too difficult to raise fairly substantial funds this way if necessary.
    d. For the previous system upgrade it was possible to cut a deal with the developer whereby ULD CARE paid for the system over a number of years, such an approach and/or other financing models can certainly be considered.
2. Revenue opportunities
    a. The traditional revenue generation from the system has been the transaction fee which is levied per transaction, the current rate being $1.50 not changed for many years.
    b. This is a rather old-fashioned approach, given that most digital services today are sold in packages rather than unit charges and it would seem appropriate to move to a more modern charging system, not only to encourage greater use of the system but also to simplify both the system itself by no longer having to produce transaction reports but also simplifying billing admin for ULD CARE.

3. Cost/benefit for IULDUG members

The current system delivers unquestionable value to IULDUG members. With an annual membership charge of $ 1050 and a transaction fee of $ 1.50 per transaction airlines can protect ULD assets worth millions of dollars.
As ULD CARE is a non-for-profit organisation there is no pressure from shareholders etc to monetise the system, enabling it to be operated on a basis of cost recovery plus a small margin for future development. With such an approach the opportunity to offer expanded reach to IULDUG members without having to impose any significant cost burden.

It is of course challenging under the current circumstances to project very far into the future of the air cargo industry but on the other hand it would be a mistake for ULD CARE to take too conservative a position when it comes to developing what is a core component of the ULD CARE function.

Section Summary

Clearly ULD CARE should be mindful of the commercial risks and opportunities in undertaking a project of this nature. However having undertaken a very extensive research and even a POC there are good grounds to believe that this can be a commercial success.

Risks and Rewards of a new system

Risks:

With any new IT implementation there is always a risk both on the actual operating functionality and also in terms of its use of friendliness/acceptance. However, there are grounds to feel fairly relaxed about such risks:

a. From a business process point of view very little is changing, the current well-established functionality of the system will be retained although with a degree of slimming down and rationalising of the reports which would appear to have a degree of redundancy in the current system. Indeed on day one of the new system taking over from the existing system the input methodology (MUC's) would remain unchanged, previous transaction history would be migrated across, and the demurrage calculations would be as before.
b. As one of the biggest risks with any new technology solutions is how quickly and easily users can accept and adapt the new system there is little risk in this direction as a new system will be extremely similar in appearance and function.
c. The POC has already proven the use of Blockchain to support the IULDUG functions very satisfactorily and there is very low risk of any loss or miss calculation of data.
d. It is hard to imagine there being any risk associated with a drop-off in usage due to the switch to a new system and indeed the opposite should be the case particularly with its integration with the paperless UCR.

Rewards:

1.
    a. Moving to a new system the IULDUG will be future proofed for a considerable number of years, there seems very little probability that there will be any change in the basic nature of ULD transfer operations, the ULD numbering system is unlikely to change significantly, and there is no reason to believe that external changes would render the IULDUG obsolete.
    b. One of the primary drivers behind moving to a new system is to enhance a number of functions while retaining the basic features:
        i. Ability of the system to handle ULD transfers occurring outside the current airline to airline envelope.
        ii. Provide IULDUG users with a platform to levy demurrage for slow return on their downstream partners such as forwarders.
        iii. Provide ULD managers with real time visibility of their entire ULD assets, removing the current off airport "black hole" where ULD move into a forwarder and off an airline's radar.

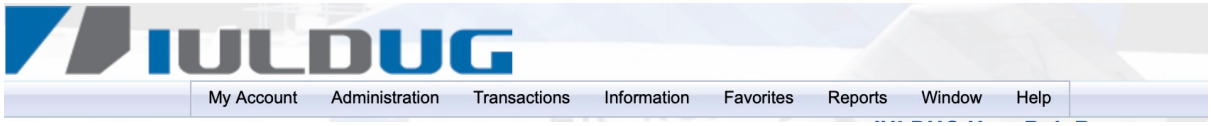
c. With a seamless record of the transfer transactions of any particular ULD the asset owners will be more able to trace the source of damage and hold parties responsible.
d. While ULD CARE does not have ambitions to expand its remit beyond just being a neutral platform or clearing house for ULD transfers there is every likelihood that a modern, wide-reaching IULDUG system can act as a stimulus for related developments by other parties.

Section Summary

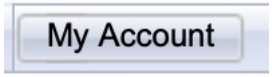
It would appear that there are very limited risks and considerable benefits from embarking on a next generation IULDUG system.

Current system user interface screens

1.



2.

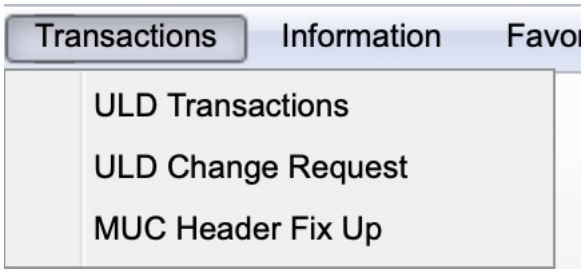


Login and password functions

3.

Control Centre is used only by administration to manage users and the system.
Inventory is used by members to add new units into their inventory listings (not required under new system)
Lost and found is a separate function, not widely used.
Profiles are of member organisations and individual users, used to set up access rights etc.
Add requests is to add a new airport or new ULD type.

4.



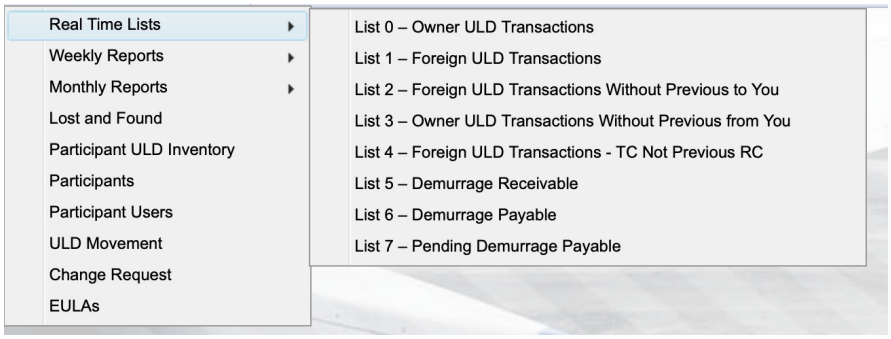
ULD Transactions: Used for entering transactions on line.
ULD Change request: Used for requesting and agreeing to changes to transactions.
MUC header fix up: Used to edit incorrect MUC headers.

5.

Reference material only.

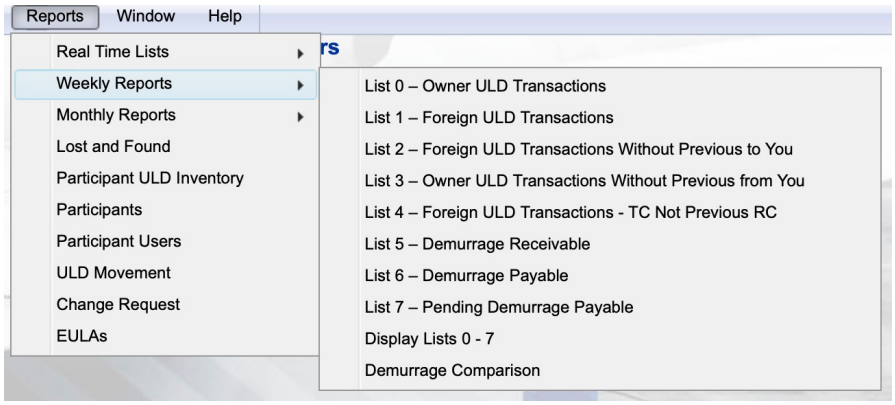
Reports are at the heart of the system:

6. Real time reports



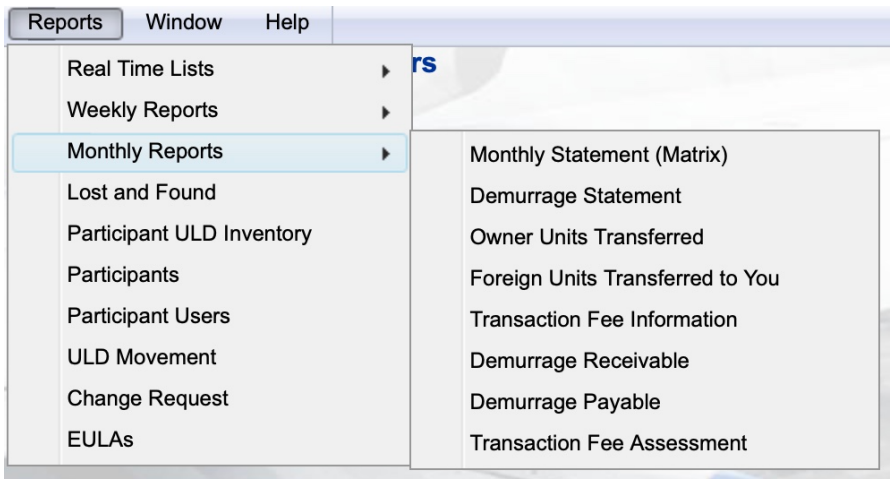
Real Time lists:
List 0. Lists all transactions for units owned by the user
List 1. Lists all transactions involving units transferred to the users operation
Lists 2,3,4 are all cases where there are missing transactions.
Lists 5,6 and 7 all relate to demurrage.

7.Weekly reports



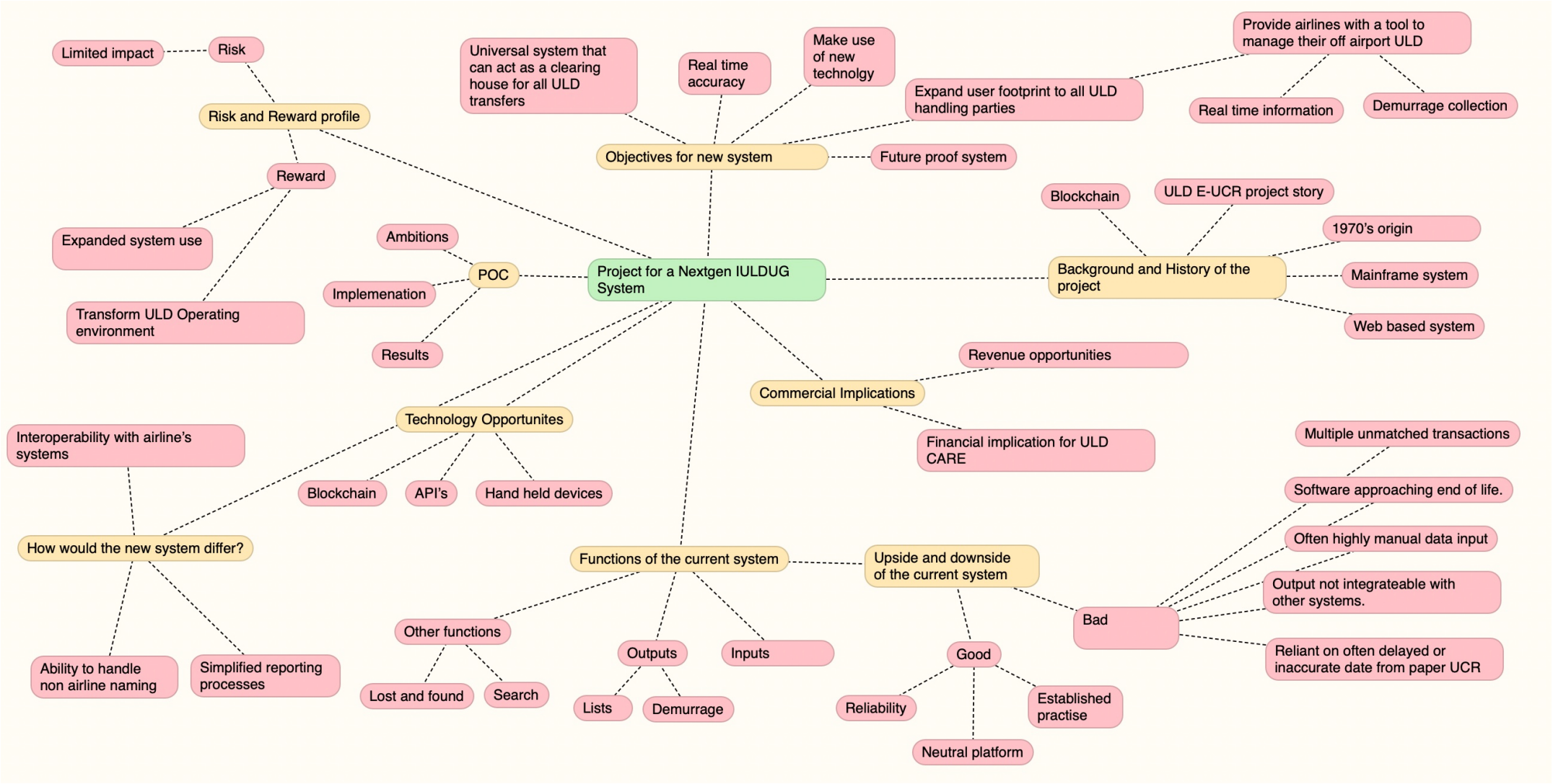
Weekly reports are produced at 0001 every Thursday morning GMT and cover the previous 7 days transactions. This is a carry over from the main frame system and has been superceeded by the Real Time lists. Likley not a requirement for the new system

8.Monthly reports



Monthly reports provide management data, in a summarised format, not dissimilar to ones monthly bank statement, and providing a historical record of transactions and demurrage.
Transaction fee information and assessment relate to the $ 1.50 per transaction charging arrangement.

Other reports: Mostly replications of functions under administration.
ULD Movement is a very useful search function enabling a search for all transactions involving any particular ULD ID code.


Limited impact
Risk
Risk and Reward profile
Reward
Expanded system use
Transform ULD Operating environment
Universal system that can act as a clearing house for all ULD transfers
Real time accuracy
Make use of new technolgy
Objectives for new system
Future proof system
Expand user footprint to all ULD handling parties
Provide airlines with a tool to manage their off airport ULD
Real time information
Demurrage collection
Ambitions
POC
Implemenation
Results
Project for a Nextgen IULDUG System
Blockchain
ULD E-UCR project story
1970's origin
Background and History of the project
Mainframe system
Web based system
Revenue opportunities
Commercial Implications
Financial implication for ULD CARE
Technology Opportunites
Blockchain
API's
Hand held devices
Interoperability with airline's systems
How would the new system differ?
Ability to handle non airline naming
Simplified reporting processes
Functions of the current system
Other functions
Lost and found
Search
Outputs
Lists
Demurrage
Inputs
Upside and downside of the current system
Bad
Multiple unmatched transactions
Software approaching end of life.
Often highly manual data input
Output not integrateable with other systems.
Reliant on often delayed or inaccurate date from paper UCR
Good
Reliability
Established practise
Neutral platform