

# Comparison of the Aircraft and MAC International Registries

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## Abstract

*In this, not-so-new, world of e-commerce, lawyers and engineers must work together to properly design online systems, to ensure these systems are effective, legally and practically. Poor technical design can undermine the acceptance of the system, no matter how well thought out the underlying legal regime. An interesting example is the set of registries pursuant to the Cape Town Convention. These specialist collateral registries are global with significant legal and commercial effect. However, that effect could be nullified with poor design. The registry operating under the Cape Town Convention's Aircraft Protocol since 2006 has recorded over 1 million registrations. In designing its sister registry which will operate under the proposed protocol on mining, agricultural and construction equipment, engineers and lawyers must resist the temptation to simply copy and paste. Respecting the success of the Aircraft Protocol registry is fine, but blindly aping its approach would lead to failure for its sister registry.*

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## I. Introduction – design as an enabler of success

The 2001 Convention on International Interests in Mobile Equipment (the 'Convention') is a private law international treaty focusing on secured creditor rights, with an individual protocol for each category of equipment. As of the date of this article, the Aircraft Protocol<sup>1</sup> is open for ratification and accession, while the Rail Protocol<sup>2</sup> and Space Protocol<sup>3</sup> are open for signature, ratification or accession. However, only the Aircraft Protocol has become effective and its International Registry operational. A fourth protocol on mining, agricultural and construction equipment (the 'MAC Protocol'), which is currently in draft form, will be the subject of a diplomatic conference in Pretoria, South Africa, in November 2019. In preparation for that diplomatic conference, this article explores what can be learned from the existing International Registry and makes recommendations for consideration by those who will take part.

The material in this article was presented at the Cape Town Convention Academic Conference in Oxford University in September 2018 and, subsequently, was updated based on the feedback and

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<sup>1</sup> 2001 Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Aircraft Equipment.

<sup>2</sup> 2007 Luxembourg Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Railway Rolling Stock.

<sup>3</sup> 2012 Protocol to the Convention on International Interests in Mobile Equipment on Matters Specific to Space Assets.

ideas received at that event. The article is based on a non-legal comparison of the International Registry pursuant to the Aircraft Protocol and the International Registry pursuant to the MAC Protocol, although some registry related legal provisions are also considered. A legal comparison of the two protocols was presented by Willian Brydie-Watson.

The International Registry pursuant to the Aircraft Protocol ('AIR'), came into operation in March 2006. Since then, it has recorded over 1 million registrations and provided over 1.2 million search results. Back in 2012, Professor Jane Winn stated, in relation to the AIR:

The International Registry may be the most successful global electronic commerce system ever built in terms of the speed with which it was implemented, its adoption rate, and the dearth of controversy surrounding its operation. The real 'driver' of its success is demand for a more efficient aircraft financing regime, while its design is an 'enabler' of the realization of that goal.<sup>4</sup>

A corollary of Winn's point is that inappropriate design could lead to the failure of a registry system. Winn also states: 'A great deal of the success of the International Registry is due to characteristics of the international market for aircraft as well as its legal and technical design.'<sup>5</sup> Therefore, the question of design as an enabler of success is considered carefully in this article.

Although this article focuses mainly on the technical design of the International Registry established under the MAC Protocol (the 'MACIR'), the legal design, which is expected to be concluded at the Diplomatic Conference in 2019, must be coordinated with its technical design. In the view of the author, and based on his experience, the welcome afforded to technical experts during the MAC Protocol development process at a meeting in Rome in December 2017 shows that the participants are already committed to this design coordination, although they may not use this term.

There are many lessons that subsequent similar registries can learn from the design and operation of the AIR, especially those under the Convention and its protocols. Careful thought should be given to the differences between the protocols, markets for the relevant equipment and general operational requirements to identify how the future MACIR should be designed and operated.

The approach in this article is to compare the AIR and MACIR,<sup>6</sup> looking at differences in the registry-related legal provisions of the Convention and relevant protocols, equipment identification criteria, Supervisory Authorities, market dynamics, operational and security requirements of likely clients, and a value chain analysis of each. Once the comparison has been completed, we briefly examine the Legal Entity Identifier ('LEI')<sup>7</sup> system, a global platform with some similarities to the proposed MACIR. We also review the six success factors identified by Winn<sup>8</sup> as they might relate to the MACIR. Following that, a list of recommendations is suggested along with concluding remarks.

## II. Comparing the two international registries

In comparing the two registries through the various lenses listed above, it should be noted that we are comparing an operational registry having 13 years of experience, industry engagement, and data

<sup>4</sup> Jane K Winn, 'The Cape Town Convention's International Registry: Decoding the Secrets of Success in Global Electronic Commerce' (2012) 1 Cape Town Convention Journal 25, 25.

<sup>5</sup> *ibid* 43.

<sup>6</sup> The MACIR is not yet established and, therefore, analysis is of the proposed MACIR as it would operate under the draft MAC Protocol.

<sup>7</sup> See section III below.

<sup>8</sup> See Winn (n 4).

(AIR) with a non-operational registry for which the underlying legal instrument is in draft form (MACIR).<sup>9</sup> Therefore, some of the points below are based on assumptions, albeit following much consideration.

### ***A. Registry legal provisions of the Aircraft and MAC Protocols***

#### *(i) The Supervisory Authority and the Registrar*

For the MACIR, should the Supervisory Authority ('SA'), after its appointment, become unable or unwilling to fulfil its role, there is no mechanism to establish a new SA.<sup>10</sup> It may be useful to resolve this issue in the final approved text of the MAC protocol. The careful selection of the SA may be an important factor in the success of the MACIR given the complex responsibilities involved in supervising the Registrar. The contract to operate the AIR and MACIR is five years in both cases.<sup>11</sup> This has the benefit of providing an incentive for the Registrar to operate the MACIR effectively and efficiently, but it also requires more regular assessments and tendering/reappointment work by the SA, when compared to the ten year contract period of the Registrar under the Rail Protocol.<sup>12</sup>

Both registries must be operated on a not-for-profit basis. In calculating the costs of the two registries, the costs of the SA are included in each case, while, for the MACIR, the costs of the depositary are added on top of that.<sup>13</sup> This seems reasonable.

Given the constant technological progress in the field of information technology, it is worth noting that the MACIR appears to be contemplated as a centralised system.<sup>14</sup> The wording may eliminate the option for a decentralised system using a technology such as blockchain.

The AIR has potentially unlimited liability under Article 28 of the Convention for compensatory damages, whereas the MACIR has limited liability, except in the case of gross negligence or intentional misconduct, of five million Special Drawing Rights per year, unless that figure is increased by the regulations.<sup>15</sup> A lower insurance cover should lead to a lower insurance premium. The lower liability may also make it unnecessary to adopt the same ultra-high security standards for the MACIR as are used for the AIR. This is not to suggest that security can be ignored; on the contrary, it will be essential, although a lower level of non-repudiation<sup>16</sup> (for example, not using digital signatures) may be acceptable for cost and simplicity purposes.

#### *(ii) Designated entry points*

Each of the Convention protocols allows the designation of an entry point, 'through which there shall or may be transmitted to the International Registry information required for registration.'<sup>17</sup>

<sup>9</sup> In this Article, references to the draft MAC Protocol are to the draft reproduced in UNIDROIT, *Study 72k - CGEI - DC - Doc. 3* (2018). This draft was agreed by the Committee of Governmental Experts at its second session in 2017 and approved by the UNIDROIT Governing Council at its 97<sup>th</sup> session in Rome in May 2018. It is the draft instrument that will form the basis of negotiations at the Diplomatic Conference in South Africa in November 2019.

<sup>10</sup> Draft MAC Protocol, Article XIV(1).

<sup>11</sup> *ibid*, Article XIV(4); Aircraft Protocol, Article XVII(5).

<sup>12</sup> Rail Protocol, Article XII(11).

<sup>13</sup> *ibid*, Article XVIII(3).

<sup>14</sup> *ibid*, Article XVIII(4).

<sup>15</sup> *ibid*, Article XVIII(5).

<sup>16</sup> See n 38.

<sup>17</sup> For example, in the case of the MAC protocol, Draft MAC Protocol, Article XVI.

There are three differences between the MACIR and AIR entry point provisions. Firstly, for the AIR, entry points must be in the same territory as the state making the declaration. This is not a requirement for the MACIR.<sup>18</sup> Secondly, the case where an entry point may not be made mandatory, for the AIR, is equipment specific (ie engines) and for the MACIR, is registration-type specific (ie notices of sale).<sup>19</sup> Thirdly, although both protocols permit multiple entry points<sup>20</sup> per contracting state, the relevant provisions seem far more likely to be exercised in the case of the MAC Protocol<sup>21</sup> where there are three different equipment types.

In both protocols, there is no connecting factor to indicate which registrations are required to go through an entry point. In the case of the AIR, it has been assumed that the state of registry of the aircraft is the connecting factor, eg any registrations on the airframe of a US registered aircraft (but not its engines) must go through the US entry point. This can be implied from Article XIX(2) of the Aircraft Protocol where a state may not make the use of entry points mandatory for engines and noting that engines do not have a state of registry. For the MACIR, it is unclear when a registration must be made through an entry point. The connecting factor could be the location of the equipment, the location of the debtor or some other factor.

*(iii) Search criteria*

Unlike the search criteria for the AIR,<sup>22</sup> the search criterion for the MACIR is simply the serial number<sup>23</sup> and does not include the manufacturer name or model designator. The search criterion for the MACIR is likely to be added to by regulation to ensure uniqueness.

***B. Equipment identification criteria***

The Aircraft Protocol, for registration and search purposes, specifies three criteria necessary and sufficient to identify an aircraft object, namely the manufacturer name, model and serial number.<sup>24</sup> Equipment covered by the MAC Protocol is more difficult to identify uniquely. The UNIDROIT Intersessional Working Group on registration criteria ('IWGRC') issued its conclusions in September 2017.<sup>25</sup> The paper provides an overview of the core issues concerning the registration and search process under the draft MAC Protocol.<sup>26</sup> The issues identified are (i) identical serial numbers used by several manufacturers, (ii) manufacturers using identical serial numbers for several different assets, (iii) exact legal name of manufacturer often not easily ascertainable for the registering person, (iv) manufacturers operating under trading names, under the names of local subsidiaries or using different 'corporate designations', (v) great number of manufacturers all over the world, (vi) changes of manufacturers' names over time, (vii) manufacturers' names, brand names or product designations written in characters of different scripts and (viii) mining, agricultural and construction ('MAC') equipment built by several manufacturers.

<sup>18</sup> *ibid*, Article XVI(1).

<sup>19</sup> *ibid*, Article XVI(2).

<sup>20</sup> *ibid*, Article XVI(1).

<sup>21</sup> No state operates multiple entry points under the Aircraft Protocol.

<sup>22</sup> Aircraft Protocol, Article XX(1).

<sup>23</sup> Draft MAC Protocol, Article XVIII(1).

<sup>24</sup> Aircraft Protocol, Article VII.

<sup>25</sup> UNIDROIT, *Study 72K – CGE2 – Doc. 11* (2017) <[www.unidroit.org/english/documents/2017/study72k/cge02/s-72k-cge02-11-e.pdf](http://www.unidroit.org/english/documents/2017/study72k/cge02/s-72k-cge02-11-e.pdf)> accessed 25 June 2019.

<sup>26</sup> *ibid* 6-7.

The IWGRC considered several alternative options, including alternative A<sup>27</sup> where the registering person would be required to name the model of equipment, but decided against such approach citing several objections, including insufficiency of this method for unique identification.<sup>28</sup> The draft MAC Protocol is therefore less precise in identifying equipment, given the nature of the equipment, relying, as it does, on the serial number, along with additional information permitted to be added by regulation.<sup>29</sup> It may be useful or even necessary to use generic manufacturer names as additional identification information, such as by listing the brand name of the manufacturer (eg ‘Caterpillar’ rather than ‘Caterpillar India’ or ‘Caterpillar South Africa’).

Only the categories of equipment listed in the annexes of the MAC Protocol can be included in the MACIR. These categories could be useful as additional identification information. If the registrant is required to identify the category of equipment, this will narrow down greatly the results for a searcher who enters that additional identification information. Any registrant should know the equipment category in order to be sure it falls under the MAC Protocol in the first place.

Photographs of the equipment could be useful for repossession purposes but, as they are currently not easily searchable by computer, they are useless for notification purposes. However, given the rapid rate of technological progress being made in computer science, future image processing and searching capabilities may make photographs of equipment useful for notification purpose. Legal drafters should not be technologically prescriptive. The MAC Protocol should provide flexibility through the MACIR regulation process to allow the MACIR to benefit from the opportunities which are likely to arise from technological developments.

Given the various languages and character sets, there is an argument that serial number should be numeric only, or that only the numeric element should be recorded. This is an area for further research that relates to the multi-lingual nature of the users and the requirements of the MACIR. If all serial numbers are written as a string of digits, search results will be more certain as format variations will be unlikely. If variations are allowed where letters and special characters are permitted, there is a risk that a searcher might be unable to find the object they are interested in. The AIR has developed a searching algorithm<sup>30</sup> to take account of these issues and that could be used as a reference.

### ***C. Supervisory Authorities***

The SA for the AIR is the International Civil Aviation Organization (ICAO), a specialised United Nations organisation responsible for global civil aviation safety standards. According to experts, ‘[c]onfidence in ICAO has been an important element’ of ratification of the Convention and Aircraft Protocol.<sup>31</sup>

The SA for the MACIR is yet to be agreed but options under consideration include the International Finance Corporation (IFC) and the International Institute for the Unification of Private Law (UNIDROIT).<sup>32</sup> Both organisations are globally respected in their domains of expertise. However, it remains unclear what experience either has in regulating a global technology platform under an international treaty. ICAO, on the other hand, has regulated aviation safety for decades and has a

<sup>27</sup> *ibid* 5.

<sup>28</sup> *ibid*, paras 31-33.

<sup>29</sup> Draft MAC Protocol, Article XVII.

<sup>30</sup> International Registry of Mobile Assets, ‘Frequently Asked Questions’, Registrations section, Question 2 <[www.internationalregistry.aero/ir-web/faq](http://www.internationalregistry.aero/ir-web/faq)> accessed 11 March 2019.

<sup>31</sup> See n 85 in Winn (n 4) 39.

<sup>32</sup> UNIDROIT, *Study 72k – CGE2 – Doc. 2* (Legal Analysis, 2017), paras 194-196 <[www.unidroit.org/english/documents/2017/study72k/cge02/s-72k-cge02-04-e.pdf](http://www.unidroit.org/english/documents/2017/study72k/cge02/s-72k-cge02-04-e.pdf)> accessed 10 June 2019.

clear understanding of its scope and responsibilities under the Convention along with the necessary resources. The SA's role in ensuring the proper design of the AIR, with the aid of CESAIR,<sup>33</sup> has been central.

The proper resourcing of the MAC SA, along with affording it an opportunity to learn from the experiences of ICAO, will ensure its success. However, if it saw its role as simply administrative, that could be a risk to the MACIR.

#### *D. Market dynamics*

In considering market dynamics, this section analyses the nature of the equipment, the parties and their power relationships, the level of consent required, how intermediaries operate in the AIR and are likely to operate in the MACIR, as well as the use of entry points.

##### *(i) Goods*

Aircraft objects range in value from a few hundred thousand United States dollars (USD) to circa 100 million USD. MAC objects are likely to range from tens of thousands of USD to around ten million USD. Very roughly speaking, MAC objects are one tenth the value of aircraft objects – an order of magnitude. This suggests that less time and money will be invested in planning the closing and that the MACIR needs to be provided at a lower cost to the end user – both in terms of the registry fee and any obligations placed on users. Winn's paper, regarding the AIR, concludes that 'its success is entirely predictable, given the disparity in the price of access to the International Registry and the value of the interests recorded in it'.<sup>34</sup> The MACIR will require a similar disparity. In order to maintain this 'disparity', the price of access to the MACIR should be at least an order of magnitude less than for the AIR.

The high cost of aircraft also means that there are professional experts involved at all stages of a financing transaction. Due to the lower cost of MAC equipment, it can be assumed that the level of professional expertise will be lower for the financing of this equipment and, hence, a higher level of error can be anticipated.

Aircraft finance is complex and comes in many varieties, including leasing, bonds and secured lending. MAC equipment, due to its lower cost, may rely less on the bond markets, although some bond market cash or export credit agencies ('ECA') financing may be provided indirectly via specialist creditors who have higher transaction volumes than the end consumer. This suggests that there may be more specialist and possibly some smaller creditors in the MAC industry and therefore a need to make the MACIR simple to use and learn. In other words, a good user experience design is important. This also suggests the need to allow for error correction in a straightforward manner.

##### *(ii) Parties*

Due to the higher object value, people trading in aircraft use sophisticated and specialised lawyers and advisers. In many cases, the bigger debtors (such as airlines and lessors financing their aircraft) have specialist expertise of their own in all aspects of aircraft trading. The cohort of smaller debtors (such as farmers and small construction firms) will be much larger in the MAC context. This suggests that the MACIR must be designed to reflect this different audience and must be focused on

<sup>33</sup> The Commission of Experts for the Supervisory Authority of the International Registry (CESAIR) recommends regulation changes to the council of ICAO and approves functional changes to the AIR technology platform.

<sup>34</sup> Winn (n 4) 29.

making the experience simpler for debtors. Equally, any extra obligations on these users should be carefully considered along with any extra support that may be necessary.

In the case of the AIR, parties are often well matched in terms of power and sophistication. In the case of the MACIR, it is more likely than in the context of the AIR that the debtors will be less sophisticated and less powerful than creditors, creating an asymmetric power relationship. This suggests that the system design cannot assume the equal power and sophistication of the parties.

On the AIR, a user of the system (whether a debtor, a creditor, or indeed a professional user acting for its client) must be approved to get an account. First, the user must provide some contact information which is verified by the Registrar. Second, the user provides identification information for the entity in question (perhaps a document of formation) which is again validated by the Registrar. Third, the user submits a form confirming its entitlement to act for the entity which must be signed by an officer of the company. All documents are reviewed and checked, contact details are tested and finally, when the Registrar is satisfied, based on the standard in the regulations,<sup>35</sup> the account is approved, and a digital certificate is issued to that account. The user can now sign-in and digitally sign registrations (consent). This works well for the AIR, but for the MACIR, given the lower equipment value and anticipated lower level of professional expertise involved in making registrations on the MACIR, a different approach may be necessary and appropriate.

With power comes responsibility. For this reason, it is suggested that the creditors using the MACIR may in some cases be expected to take extra responsibility in the registration and vetting process. For instance, the following algorithm is suggested. First, the creditor enters the registration data. Second, the creditor approves the identification and contact details of the debtor. Third, the creditor pays for the registration. Fourth, the debtor is required to review the registration and to consent with one click thus allowing the debtor to do the minimum to confirm the registration.

In this algorithm, step two will be crucial. Vetting of users by the Registrar is a major operational effort for the AIR, with approximately thirty new entities reviewed and approved daily. The challenges of approving far more entities (many of which could be individuals or entities with non-English documentation) could be overwhelming. Given that creditors have a know-your-customer (KYC) obligation and are incentivised to properly identify their debtor to collect payments, they may be best positioned to confirm the identity of the debtor on the MACIR. However, this approach brings with it the risk of misuse by the creditor which could be addressed in the text of the MAC Protocol or its associated regulations.

### *(iii) Consent*

The AIR requires both parties to consent to each registration (except for a small number of non-consensual registrations). One participant<sup>36</sup> at the 2018 Cape Town Convention Academic Conference in Oxford suggested that, perhaps, the debtor should not be required to give consent to registrations at all. This ties into a similar suggestion by a manager at Aviareto<sup>37</sup> that, perhaps, a debtor does not need a full account on the MACIR. Drawing on these ideas, another option is that debtor consent can be provided by way of electronic, rather than digital, signature, by recording the assent of the debtor in the MACIR logging system, but not requiring the formalities of a digital certificate. Another option that could be considered is allowing the creditor to decide whether they require the consent of

<sup>35</sup> International Civil Aviation Organization, *Regulations and Procedures for the International Registry* (Seventh Edition) 2016, section 4.1. See Aviareto, 'Regulatory Information' <[www.aviareto.aero/information-centre/regulatory-information/](http://www.aviareto.aero/information-centre/regulatory-information/)> accessed 17 June 2019.

<sup>36</sup> Ms Jacqueline Cook, Senior Professional Support Lawyer, Stephenson Harwood, UK.

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## Comparison of the Aircraft and MAC International Registries

the debtor on a case by case basis. A creditor might decide that, for higher value items, they require consent, but for lower value transactions on a one-off basis (such as financing a tractor for a farmer) a specific consent is not necessary. The above options are effectively a sliding scale of non-repudiation schemes<sup>38</sup> along the following lines, from most to least binding.

- (1) Both parties indicate their consent by applying their digital signature based on digital certificates and public key infrastructure (PKI)<sup>39</sup> (as is done on the AIR).
- (2) The creditor applies its digital signature and the debtor applies an electronic signature by clicking 'OK' while logged in as an authenticated user.
- (3) The creditor applies its digital signature, but the debtor does not have to take any action. The debtor would be notified of the registration automatically.

The MACIR could be set up in any of the above ways, or as a mixture of these options, on a transaction by transaction basis, as decided by the creditor.

### (iv) Intermediaries

Over 90% of aircraft registrations are made by intermediaries, such as lawyers representing their clients and specialised registration firms. Intermediaries may also play an important part in the MAC registration process, especially for larger debtors.<sup>40</sup> These intermediaries are likely to be smaller and less specialist in the use of collateral registries. They may include local lawyers and some larger firms that may establish a service to support this market, as well as sales agents and distributors.

This suggests that the use of intermediaries could reduce the need for debtors to learn about the International Registry and its associated rules and entry points. Therefore, good training and support for smaller MAC intermediaries will provide long term benefits. Intermediaries in the private sector, such as sales agents, are more likely to offer practical advice than governmental employees who, by their nature, may be reluctant to offer any.

Designing the MACIR in a way that facilitates intermediaries may be crucial to its success.

### (v) Entry points

All protocols to the Convention to date have contemplated the use of designated entry points. The Aircraft Protocol allows for designated entry points and the AIR regulations further distinguish between two types of entry points, namely Authorising Entry points (AEPs) and Direct Entry points (DEPs). Only AEPs are currently in use on the AIR. In the case of AEPs, the state in question designates an entity within its territory to approve registrations by issuing an AEP code to the intending registrant. This code is then typed into the AIR as the registration is being entered. The AIR system verifies that the code is in the right format for the particular state. As noted in section II(A)(ii), for

<sup>38</sup> A scheme which makes it difficult for a person who has assented to then repudiate that assent. Some approaches are more thorough than others, hence the sliding scale.

<sup>39</sup> Public key infrastructure ('PKI') allows users, *inter alia*, to digitally sign data, to validate a signature, to tie a signature to an entity named in a certificate issued by a certification authority and to identify against a system. It is based on digital certificates and is of a higher standard than basic electronic signatures.

<sup>40</sup> The assumption being that some smaller debtors may use their creditor to enter the registration data and consent on their behalf on the MACIR, if that is allowed.

the MACIR, it is unclear when a registration must be made through an entry point. The connecting factor could be the location of the equipment, the location of the debtor or some other factor. This needs to be clarified in the MAC Protocol.

In the case of the MACIR, given the three ranges of equipment (namely, mining, agricultural and construction), there are likely to be multiple entry points in some states. This suggests that standardisation of entry point operations and security will be necessary for the MACIR to operate efficiently. This could be achieved through the MACIR regulations, should the MAC Protocol allow the SA to do so. However, states will insist on maintaining their autonomy, so careful consideration should be given to the nature of the entry point standards.

### ***E. Operational and security requirements***

Most aircraft transactions are priced in USD and parties are happy to pay the International Registry fees in that currency. With the MACIR, parties are likely to prefer local currencies to reduce their foreign exchange exposure and to avoid costly exchange fees. The payment system will be handling a large volume of low value payments, and so the transaction costs must be low. This suggests that it will be important for a wide range of payment options to be available in multiple currencies as part of a flexible and low-cost system.

The language of aviation is English<sup>41</sup> and almost all users of the AIR are comfortable working in English. The provision of all the AIR support material and help documents in the six ICAO languages further reduces language problems. It is assumed that the MAC Protocol users are likely to prefer their local language and fewer of them will be proficient in English. This suggests that the MACIR be as graphical as possible with a major focus on simplifying the user interface and on providing help in multiple languages. While it would be economically unfeasible for the MACIR to be fully multi-lingual, a significant investment in this area will be important.

From a security perspective, the MACIR may have a higher profile and will record more data than the AIR. Users are likely to operate less sophisticated and less secure devices to access the MACIR and may have less expertise in the area. This suggests that the security posture of the MACIR should be derived *de novo* based on specific threat analysis rather than simply copy that of the AIR.

Improper registrations are a feature of many registries. A report for State Business Filing Agencies in the US stated that ‘financing statements with no legitimate basis under the UCC, often referred to as fraudulent or bogus filings, are a persistent problem for state filing offices and the individuals targeted by these spurious claims.’<sup>42</sup> On the AIR, there have been less than twenty legal cases commenced regarding purported invalid registrations, almost all under Article 40 of the Convention.<sup>43</sup> These registrations relate to registrable non-consensual rights or interests, which, due to their unilateral nature, do not require consent of the debtor and for this reason have been abused in some cases.

<sup>41</sup> Annex 10 (Vol II, 5.2.1.2.2) to the 1944 Convention on International Civil Aviation recommends that English be universally used for international aeronautical radiotelephony communications. Also, in its 13 years of operations, the AIR has operated in English only. The annual customer satisfaction survey in 2018 shows the highest performance score of all measured factors for registry official language skills although all services are provided in English only. See Ian McShane, ‘Aviareto User Survey’ (2018) <[www.aviareto.aero/wp-content/uploads/2018/12/Aviareto-User-Survey-2018.pdf](http://www.aviareto.aero/wp-content/uploads/2018/12/Aviareto-User-Survey-2018.pdf)> accessed 17 June 2019.

<sup>42</sup> National Association of Secretaries of State, ‘State Strategies to Subvert Fraudulent Uniform Commercial Code (UCC) Filings’ (2014) 3 <[www.nass.org/sites/default/files/surveys/2017-08/final-nass-report-bogus-filings-040914.pdf](http://www.nass.org/sites/default/files/surveys/2017-08/final-nass-report-bogus-filings-040914.pdf)> accessed 25 June 2019.

<sup>43</sup> The AIR Registrar was a party in all of these cases in the Irish high Court.

The AIR regulations have progressively tightened the rules for making these registrations and the numbers are dropping significantly.<sup>44</sup>

This area requires some thought from the drafters of the MAC Protocol, but given the lower value of the MAC equipment, a pragmatic approach will be required. If the same issues arise for the MACIR as have arisen for the AIR, the equipment owners will be less willing to come to the court in the state where the Registrar is based, due to the high legal costs when compared to the low equipment value. This could undermine the MAC Protocol itself. Therefore, a new approach is needed. In the US, '[g]enerally speaking, the state laws that address this issue can be categorized into four different approaches: pre-filing administrative discretion, post-filing administrative relief, post-filing expedited judicial relief, and enhanced criminal/civil penalties.'<sup>45</sup> It may be useful to study the approach of others.

#### *F. Value chain analysis*

As a way of analysing the value added by each party in the Convention's registration ecosystem, a form of value chain analysis has been completed for 1) an airline buying an aircraft and 2) a farmer buying a tractor (both using secured credit). These two cases are, to some extent, the most extreme examples, with the aircraft financing involving high value, highly regulated equipment as well as teams of lawyers and advisors and the tractor financing covering lower value equipment with much less professional advice and, potentially, no lawyers involved. In some cases, the MACIR transactions will be closer to the AIR example, especially for expensive mining equipment. This could also be true, at times, for the other two equipment types. The benefit of choosing such extreme examples for comparison is to identify the critical differences in the AIR and MACIR, noting that the MACIR must operate across this wider spectrum of sophistication.

The model proposed in this article seeks to identify the value added by each stage or participant and, through that, the critical differences. Appendix 1 provides two diagrams, one for each type of financing transaction. For the purposes of this exercise, the value chain shows some of the key participants as the transaction progresses. The roles are explained on the diagram.

The value chain for the AIR shows the advisor advising the decision-maker. The decision-maker decides and instructs the Transaction User Entity ('TUE')<sup>46</sup> who manages contractual risk and instructs the Professional User Entity ('PUE')<sup>47</sup>. The PUE ensures the proper registrations are made on the AIR. The Registrar ensures that the AIR is available, suitably designed and managed. The AIR platform itself provides evidence of the priority of the interest registered, notice to the world of the claimed interest and insurance cover if a loss is suffered due to an error or omission of the Registrar.<sup>48</sup> The AIR is underpinned by the Convention and the Aircraft Protocol, which provide the legal basis.

The value chain example for the MACIR is similar, but the following differences are important.

- (1) The advisor is less likely to be an expert or independent consultant and may even be a sales channel.

<sup>44</sup> The AIR annual statistical report for 2017 shows Article 40 registrations hitting a peak in 2015 of 206, declining to 145 in 2016 and further declining to 45 in 2017. See Aviareto, 'Twelfth Annual Statistical Report 1 January 2017 – 31 December 2017' (2019) <[www.internationalregistry.aero/ir-web/annualStatisticalReport/download/2017](http://www.internationalregistry.aero/ir-web/annualStatisticalReport/download/2017)> accessed 17 June 2019.

<sup>45</sup> See National Association of Secretaries of State (n 42) 7.

<sup>46</sup> A Transaction User Entity on the AIR is a party that can be named in a transaction, such as the creditor, debtor, seller or buyer.

<sup>47</sup> A Professional User Entity on the AIR is an intermediary (often a lawyer) who is authorised to effect registrations on behalf of a TUE or multiple TUEs. This is often an expert on the International Registry system and procedures.

<sup>48</sup> Convention, Article 28.

- (2) When the farmer decides what equipment and commercial arrangement he or she wants, the farmer will not have access to the inhouse counsel to manage contractual risk. The farmer will rely on the standard contractual terms<sup>49</sup> from the dealer or manufacturer, or the creditor. This is an example of asymmetric power relationship and the reason the farmer is likely to be attracted to a strong brand.
- (3) The farmer is less likely to use a PUE who specialises in the MACIR registrations. Rather, the farmer may rely on the dealer, creditor or possibly some specialist agent to ensure the registrations are properly made.

This suggests that the MACIR should be simple to use. It should allow users (especially lower end debtors) to easily consent to a registration (or alternatively, not to have to consent) and not require them to do a detailed analysis or be expert on the best practice in the use of the MACIR. The asymmetric power relationship must be recognised between creditors and debtors where it exists.

### III. The LEI system - what can we learn from its success?

In 2008, driven by the global financial crisis, the G20 tasked the Financial Stability Board with establishing a system for issuing standard and globally unique identifiers to legal entities, particularly in the finance industry. Thus, the Legal Entity Identifier system was born, beginning operation in 2011. It must be considered a success having registered more than 1.2 million entities globally and issued them each with an individual LEI.

The challenges facing the LEI system are likely to include the following.

- (1) Not all users speak English, they speak their native language.
- (2) Technical support is required by clients globally, in different time zones, on differing technology platforms, in different languages and from different cultures. This will make the use of intermediaries critical.
- (3) A wide range of clients, ranging from small and simple to large and sophisticated. However, the smallest clients on the LEI system are likely to be bigger than the smallest MACIR users. This is because the LEI system, initially at least, is comprised of finance organisations such as banks.
- (4) It is crucial that the LEI system has a clear governance structure due to the importance of this information system.

Due to its similar nature, the MACIR system may face similar challenges.

The solution chosen for LEI is a federated system where one body, the Global Legal Entity Identifier Foundation (GLEIF),<sup>50</sup> sets standards for data and controls Local Operating Units (the 'LOU's). These LOUs issue LEIs in their geographical or industry area. Entities can use the services of a Registration Agent to access the LOU. A Registration Agent helps legal entities to access the network of LEI issuing organisations responsible for performing LEI issuance and related services.<sup>51</sup> The overall system is governed by the LEI Regulatory Oversight Committee (the 'LEI ROC'). The LEI ROC is made up of the International Monetary Fund (the 'IMF'), central banks and financial authorities.

<sup>49</sup> It may be the case that some of these transactions are covered by consumer protection laws.

<sup>50</sup> GLEIF was established by the Financial Stability Board in June 2014 to support the implementation and use of the LEI.

<sup>51</sup> See LEI, 'Get an LEI: Find LEI Issuing Organizations' <[www.gleif.org/en/about-lei/get-an-lei-find-lei-issuing-organizations](http://www.gleif.org/en/about-lei/get-an-lei-find-lei-issuing-organizations)> accessed 9 June 2019.

## Growth in Total Number of Active LEIs

### New LEI Issuance | Fig.-4

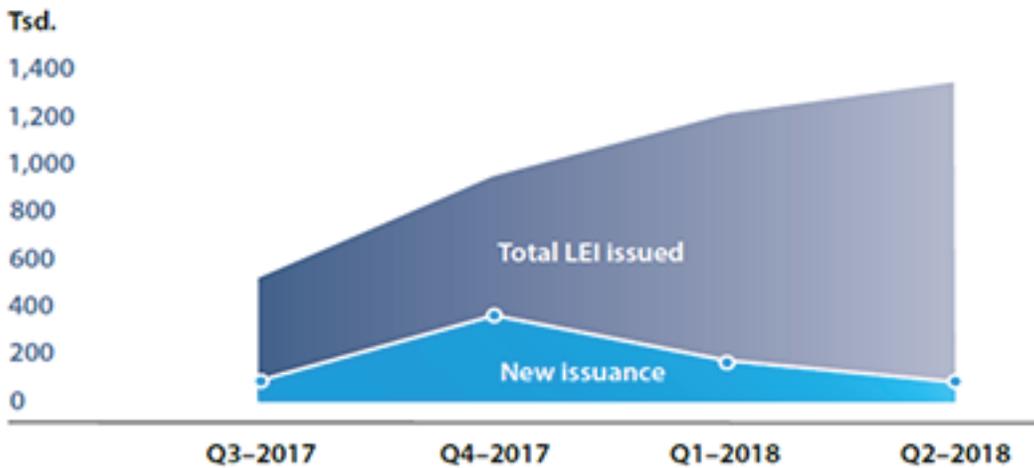


Figure 1 – Legal Entity Identifiers<sup>52</sup>

There are two types of LEI data described in the 2018 business report on the global LEI system report: level 1 and level 2.<sup>53</sup> Level 1 data answers the question, ‘Who is who?’ It consists of name and address. Level 2 data answers the question, ‘Who owns whom?’ It consists of the identity of the parent company and the ultimate parent company, both of whom, ideally, should have their own LEI.<sup>54</sup> According to this report, data can be ‘fully corroborated’ against a public record or ‘entity supplied only’.<sup>55</sup> There is an initial cost and then an annual fee – both typically below USD 100, and the cost is falling due to competition.

This suggests that, for the MACIR, a purely centralised system is not the only option and also that a comprehensive system of governance or supervision is important. This also suggests that appropriate intermediaries are vital. As a side note, it may be that the MACIR could rely on LEI registration of entities, especially creditors, as a way of, indirectly, outsourcing the identification and vetting of these entities.

#### IV. Review of Jane Winn’s success factors for the AIR

In her paper, Winn lists the following six success factors that applied to the AIR:

<sup>52</sup> See Global Legal Entity Identifier Foundation, ‘Global LEI System Business Report’ (Q2, 2018) 5 <[www.gleif.org/content/4-lei-data/2-global-lei-index/2-download-global-lei-system-business-reports/20180808-download-global-lei-system-business-report-q2-2018/2018-08-08\\_quarterly\\_business\\_report.pdf](http://www.gleif.org/content/4-lei-data/2-global-lei-index/2-download-global-lei-system-business-reports/20180808-download-global-lei-system-business-report-q2-2018/2018-08-08_quarterly_business_report.pdf)> accessed 11 March 2019.

<sup>53</sup> *ibid* 2.

<sup>54</sup> *ibid* 8.

<sup>55</sup> *ibid* 2.

- (1) concrete 'value proposition';<sup>56</sup>
- (2) mandatory, formal regime;<sup>57</sup>
- (3) collective action problems;<sup>58</sup>
- (4) mature technology;<sup>59</sup>
- (5) organic development;<sup>60</sup>
- (6) responsive governance.<sup>61</sup>

It is worth briefly reviewing each to see how they relate to the proposed MACIR.

The value proposition for the AIR is the demand for a more efficient aircraft financing regime. It appears that there is also a concrete value proposition for the MACIR. The preliminary economic assessment prepared by Warwick Economics and Associates and presented to the MAC Protocol Committee of Governmental experts at its second session in Rome in 2017<sup>62</sup> estimated the economic benefits of the MAC Protocol as ranging between USD 68 billion and USD 98 billion. However, at paragraph 5.42 it was noted that the next phase of analysis will generate results that are lower.

Winn, in discussing the AIR, says, 'the requirement to register interests in the International registry in order to secure priority over competing claims is "hard law"'.<sup>63</sup> This mandatory, formal regime for the MACIR will be similar to that of the AIR.

Winn identifies the collective action problems as follows: 'Collective action problems arise when large groups of individuals need to work together to solve a problem, but cannot because some individuals will try to 'free ride' on the efforts of others.'<sup>64</sup> She further explains that the International Registry (namely, the AIR) avoids collective action problems as the AIR can be considered a 'club good' because it is 'non-rivalrous and non-exclusive for any normal volume of use'.<sup>65</sup>

The use of PKI, a mature technology was seen by Winn as a success factor.<sup>66</sup> However, for the MACIR, the cost and complexity of PKI may not be appropriate in all cases. Winn states that 'in the context of global aircraft finance, operating a traditional PKI is relatively inexpensive, even though in other contexts, operating a PKI might be so expensive as to create barriers to the growth of new markets'.<sup>67</sup>

Winn notes: 'the drafters of the CTC wanted the International Registry to be built on the foundation of current electronic commerce best practices. As a result, the use of information technology has evolved organically within the CTC framework'.<sup>68</sup> There appears to be no reason that a similar approach could not also take place with the MACIR. This article may be part of the requirements

<sup>56</sup> Winn (n 4) 21.

<sup>57</sup> *ibid.*

<sup>58</sup> *ibid.* 22.

<sup>59</sup> *ibid.* 23.

<sup>60</sup> *ibid.* 24.

<sup>61</sup> *ibid.* 27.

<sup>62</sup> UNIDROIT, *Study 72K - CGE2 - Doc. 16* (2017) 37, Tables 5.4 and 5.5 <[www.unidroit.org/english/documents/2017/study72k/cge02/s-72k-cge02-16-e.pdf](http://www.unidroit.org/english/documents/2017/study72k/cge02/s-72k-cge02-16-e.pdf)> accessed 17 June 2019.

<sup>63</sup> Winn (n 4) 21.

<sup>64</sup> *ibid.* 44.

<sup>65</sup> *ibid.* 45.

<sup>66</sup> *ibid.* 23.

<sup>67</sup> *ibid.* 24.

<sup>68</sup> *ibid.* 3.

elicitation process that Winn believes is essential to the success of an electronic system. Winn also states: 'One of the fundamental challenges in the successful design and deployment of electronic commerce system is identifying the optimal division of labor between machines and people.'<sup>69</sup> Careful thought should be given to this division in the MACIR, which may be subtly different to the division on the AIR. As an example, perhaps MACIR officials, in vetting creditors, could rely on the LEI system instead of carrying out that labour themselves.

Lastly, Winn states that 'since it was established, the International Registry's governance institutions have proven to be flexible and dynamic in responding to market conditions'.<sup>70</sup> Winn describes this as 'an effective self-regulatory governance system'.<sup>71</sup>

When we look at the six success factors identified by Winn, all are present in the context of the MACIR, although several of them (namely, 1, 2, 4 and possibly 6) are weaker than those applicable to the AIR. This suggests that, in order to improve the chances of success for the MACIR, it is important to target the success factors that are controllable. We must select the technology carefully, ensure we have industry engagement and establish an effective governance arrangement. Also, as to Winn's concluding point, given the lower asset value, the price of access to the MACIR must be lower than for the AIR.

## V. Recommendations

The list of recommendations below is derived from the detailed analysis above. While the article did not set out to make any legal recommendations, given the tight interplay between the technical and legal design, several legal recommendations are first set out. Then, the technical design recommendations are proposed, including some areas which would benefit from further research.

A good design is an enabler of success. The key design points for the MACIR are:

### A. Legal design recommendations

- (1) Article XIV(1) of the draft MAC Protocol should be redrafted to allow for the replacement of a Supervisory Authority. A replacement provision would provide flexibility to deal with potential future institutional changes at the SA.
- (2) Article XVI of the draft MAC Protocol should define what the connecting factor is for a registration to fall within the designated entry point rules of a contracting state. This will bring clarity to an area which, due to the three types of equipment, may be more complex than for the Aircraft Protocol.
- (3) Article XVIII(4) of the draft MAC Protocol should be redrafted to ensure that a decentralised or federated system design is not excluded from the options available to the Registrar. In this case, a technology neutral drafting style would ensure options that become available in the future are not unintentionally excluded.
- (4) The MAC Protocol should allow the SA to establish standards for the operation of a designated entry point. These standards should be set out in the MACIR regulations and should take account of the sensitivities of states while at the same time trying to ensure a consistent level of operation at each designated entry point, where possible.

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<sup>69</sup> *ibid* 47.

<sup>70</sup> *ibid* 3.

<sup>71</sup> *ibid* 21.

- (5) The MAC Protocol should provide for enhanced mechanisms to deal with, and discourage, improper unilateral registrations. There are several options, including greater involvement of the Registrar or a sharper set of rules allowing a court to order a discharge and punish the registrant in the case of unilateral registrations or, potentially, guidance in the regulations to allow a pragmatic position to be taken where clearly improper registrations are ignored. Alternatively, not permitting unilateral registrations or, if permitted, requiring an independent third party to also consent to the registration may reduce abuse. All options should be considered.
- (6) The MAC Protocol should consider whether any useful articles can be included to ensure the asymmetric power relationship between the parties is not abused and that the less powerful are protected, for instance through reference to consumer protection laws.

***B. Technical design recommendations:***

- (1) Selection of the SA and its resourcing will be critical. A comprehensive governance/supervision system, similar to that within which the LEI operates, is essential.
- (2) Information security should be appropriate to the risks of the MACIR and is different, in some respects, to the AIR. As a result, the security stance should be derived *de novo* based on a threat assessment specific to the MACIR.
- (3) The cost of access and use of the MACIR should be lower compared to the AIR.
- (4) The MACIR should place a greater emphasis on simplicity of use through careful workflow and screen design including a different approach to vetting of users in order to be approved for an account, registrations and consent. First, one could consider relying on LEIs for creditors and debtors being vetted by creditors. Second, the registration process could permit all data entry and payment to be performed by the creditor. Third, consent to registration could range from full digital signature by both parties to only requiring the consent of the creditor (and not the debtor), or some intermediary option.
- (5) The MACIR should allow a simple mechanism to correct basic errors in registrations.
- (6) A wide range of payment options will be essential with low transaction costs.
- (7) A significant investment in multiple languages will be necessary, although having a fully multi-lingual system seems infeasible. A simple design (if implemented) may reduce this need.
- (8) A federated design should be considered. Given the more diverse range of users and their local needs (local language etc) on the MACIR when compared to the AIR, a centralised system may not be ideal, and a federated system may help to solve local issues locally. This approach has been taken by the LEI system, which has been a success.
- (9) Adequate research should be done on technology selection, ranging from a mature technology like PKI to new two factor authentication technologies to provide adequate security and non-repudiation.
- (10) Industry engagement, on as wide a basis as possible, will enhance the chances of success and ensure there are no collective action problems. Intermediaries should be supported on the MACIR with adequate training and resources.

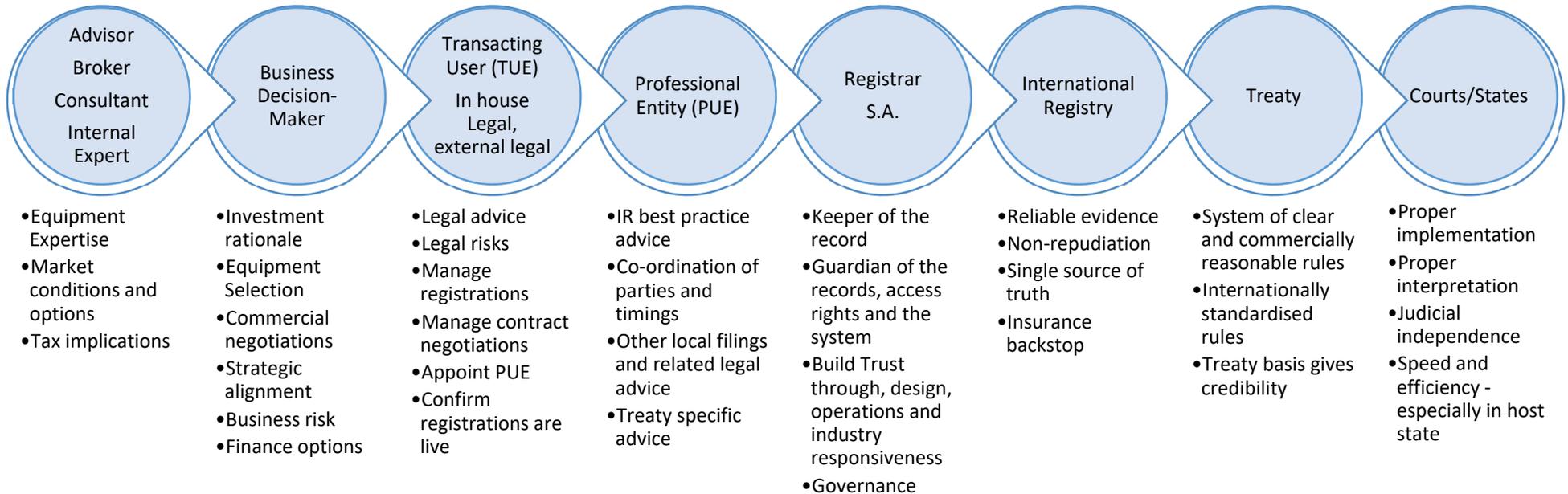
## Comparison of the Aircraft and MAC International Registries

- (11) Equipment identification will be more complex in the context of the MACIR, which will have an impact on making registrations and searching. Although photos could be used to aid repossession, they would not be useful for notification purposes. The MAC Protocol should allow flexibility for the Registrar in this matter. Research should be done into the optimum search algorithm and search data to ensure that no user is ever misled by the MACIR. Consideration should be given to using harmonised codes and manufacturer names as supplementary information for registration and searching.

## VI. Conclusion

Winn describes design as an enabler of success in the AIR. In attempting to establish a successful MACIR, design is essential to its success. The MACIR and AIR will differ in many important respects. Having reviewed the conditions in which the MACIR will operate, comparing it to the AIR and LEI systems and having reviewed Winn's list of success factors, we have identified a set of recommendations above. However, some of them are based on assumptions and should be tested through industry engagement. Some of the recommendations require careful analysis to identify and formulate potential amendments to the draft MAC Protocol.

## A. Airline buying an aircraft



## B. Farmer buying a tractor

