

Stephane Kastler, Director of Maintenance & Production, Cargolux, takes some time to talk to Chris Reed, Managing Director of TRAX, about the how & why of their successful implementation of the eMobility Shop Control App

**Chris Reed (CR):** Thanks for joining us, Stephane. It's great to be able to hear how Cargolux has implemented the TRAX eMobility Shop Control application.

We have a few questions that we will go through, so let's get straight on with those.

Can you start by telling us a little bit about your business case for implementing the app and how you've seen it maximizing your operation?

Stephane Kastler (SK): Thanks for having me here Chris.

The shop control app is used in our shop environment. In Cargolux we have 10 back shops which support the airline and the maintenance organization, and their mission is to repair many 747 components for the fleet. At the same time, they also support the hangar and the line operation directly. So that's what we have grown to in the last few years. Basically we are repairing about 10,000 components per year.

It is a lot of components, many of which are needed urgently or are required on an AOG basis.

With so many components traveling through the different shops, we need to track them and their progress.

"The more you reduce the working process, the more you make life simple for the shops and for the people who are working on the parts. That is the name of the game, that's what we are achieving here."



With the increase of our fleet and the rise in the numbers of components that we are repairing, it has become very clear that we need to have a system which shows us an overall priority and progress tracking status on the parts that we are repairing. That is what the Shop Control app does for us.

You can see where we are coming from is a situation where components were coming off wing and in need of repair, and we would just send them to the shop. The shops receive a lot of components and they have to figure out the priorities.

The shops have to figure out what needs to be done on the components. This creates a large backlog of parts for them, and with a large backlog comes a lot of issues of space, of



priorities with other elements of the organization, etc. That had become a major problem for us.

At the same time when you have these ten thousand components which each sometimes require very small action in different shops it starts to be very difficult to know where you stand with all these components.

So some time ago we decided that we need to create a system --a process let's say-- which is controlling the inductions of our parts into the shops system. As well, we need to control the induction of parts into our 10 shops, and

once the part is inducted into the system, we have to make sure that it has the right priority and that we can track it in real time.

That's basically what the Shop Control project was for. The Shop Control app is giving us a way to decide when the part needs to be sent to the shop for repair, when is it needed, and when it has been released. We can track in real time what is happening to that part and that's extremely critical. By doing this you manage your parts, you manage your parts 'in process', you are reducing your turnaround time, and you are able to take the right decisions and to repair the right part at the right time.

That is where the added value is, of course. The turnaround time is immediately linked to the number of parts you need to hold in your stock. So the better we are in turnaround time the better we are supporting the airline.



**CR**: Brilliant, very good. Thank you very much.

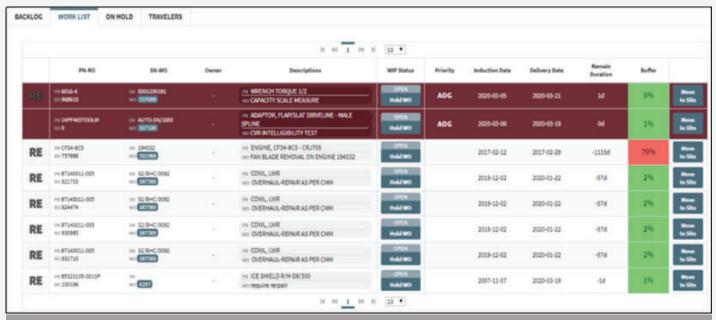
### So overall how do you think that the maintenance digitization has impacted your profitability?

**SK**: What we are looking at in Cargolux is to have the best way possible for mechanics to focus on their core job which is to maintain and to repair the airplanes.

We are trying to remove non-value-added time away from the work of these mechanics and that is what digitalization is doing for us.

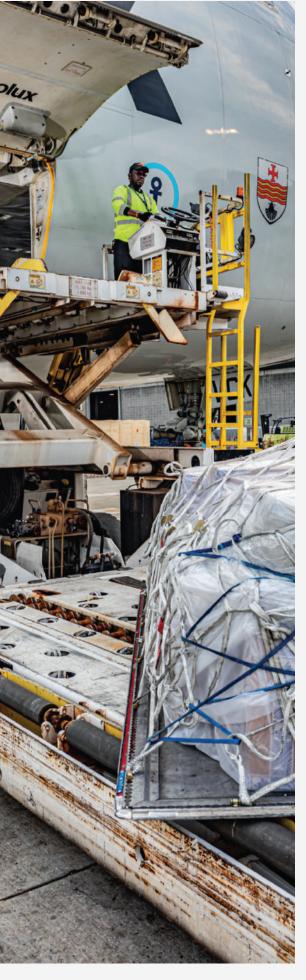
It is simplifying our processes and it is also bringing to the mechanics the right information at the right time in a real-time format so that we are able to cut down on some processes which are cumbersome.

We are cutting down, for example, white boards which we used to have not too long ago in the different shops. They are now replaced by screens which are displaying real-time information.



The Work List window above shows what is due – including delivery date and AOG status if applicable -- and what currently should be worked by the shop at the moment.

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Digitization is also bringing a lot of aspects which were just not possible before.

A good example is task cards. We still have paper task cards today but soon they will be transferred to digital.

Interestingly, when a mechanic is doing a task and signing off on the paper task card, this process is not controlled.

Somebody may have to come and check if this was the right mechanic with the right skill that has been stamping that task and confirm if he was authorized to do that.

So there are a whole lot of manual processes implied in the background of that manual stamping.

Now that we are working digitally, we are able to control the task card. We issue the task on the iPad and only the mechanic with the right skill and a skill which is not expired can sign off.

The system performs what is in effect an automated QA which is replacing a very cumbersome manual process which was in place up to up to now. It is error free whereas we never managed to get there with a paper process.

CR: Very good, yes, that's great.

So, what has been the response of your employee team to the introduction of this app and the adoption of new technology as part of your efforts to mobilize your maintenance operation?

**SK:** It has been extremely good. Not only because all technicians see something nice or fancy, but because it is immediately making their life simpler.

They now have access to real-time information so that means that they don't have to go in the system and look for it or call somebody to look for it.

As well, it is creating data which is providing them an oversight of the situation of their shop or team. They don't have to go and look at all these components to check the status on a regular of weekly basis. It is on the screen right in front of them and it is always up to date.



We have removed all that manual work of creating the status, which was the case up to now.

This solution also provides good visuals. If the status is bad, it is red. It is going to show red as of the time we decide we need to pay attention to the component.

It provides easy visual management for everybody across the organization to see how we are doing.

So from the technician to the vice president they can come to the shop and see a screen with reds, and know that there might be something that we need to look at today.

### CR: Can you describe some features they're using and how they aid your team members and the company?

**SK:** The shop control app is now implemented in every one of our shops and is used on a daily basis.

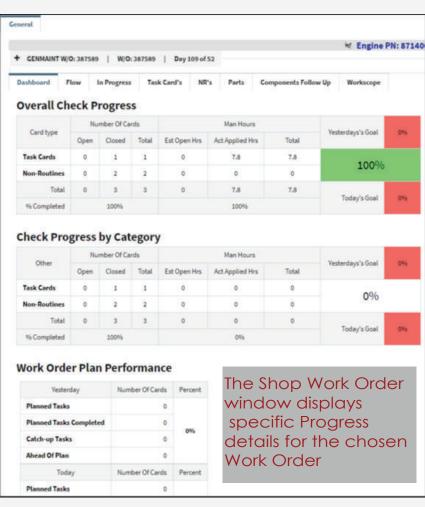
I will demonstrate the features that they are using on the screen. It is a simple but effective system, and it is also very easy to understand, so it only needs a basic training of a couple of hours.

With a given situation, you click and enter the information and quickly see it. You don't have to print the task out, you don't have to print paperwork to sign, and it's all traced in the system.

It's efficient, it's lean, and basically very good.

CR: How is the dashboard high level overview such as the shop indicator detail window helping with your managers for following the KPIs?

**SK:** This is extremely critical. It is very beneficial to have KPIs which are compiled in a live format like this because we come from a situation where we used to manually compile our KPIs.





This was done maybe on a weekly basis, or a monthly basis, so you are already looking at something which is expired. You are looking at what you have been doing in the last week or in the last months and then you look at that and you try to see if you need to take corrective actions.

Now it's live, it's in front of you, it's up to date at any time, and this is extremely valuable because then we can take the actions which are necessary at the earliest point of time. This is extremely critical for a shop environment because the issue of today is the stock shortage in terms of parts needed for tomorrow or the day after.

If you have a component that is dragging in the shop due to a dependency, and if it is not escalated, than this component keeps on being delayed which will ultimately create a stock shortage.

If instead you react a few days in advance of the situation then you are in a much better position and not faced with zero stock.

"What we are looking at in Cargolux is to have the best way possible for mechanics to focus on their core job which is to maintain and to repair the airplanes."

CR: Very good. That's great thank you.

Did your end users find the training to be helpful and the product to be intuitive and easy to learn?

**SK:** Yes, definitely. The training was quite short. The user guides are also very easy to understand because basically the app is intuitive, as I'm going to show you online in a minute.

It is state of the art and what you would expect from such a software nowadays. It has a modern feel to it, and you get right to it. It is no questions asked.

We have had very limited feedback or a very limited number of questions put to us because it was just a good implementation.

CR: That's great thank you.

So how would you describe the implementation project support?



**SK:** The implementation of the project and support from TRAX was great. First of all, what I really appreciated was that they were really open and interested in developing something new. The shop control project that we had at Cargolux was an idea which was already a few years old. We were more or less stuck with the development of the real-time software which was linked to that project because it was a difficult tool to set up. Yet TRAX was really interested in developing an app.

It was quite unbelievable how fast TRAX developers became familiar with the shops, our processes, how all our shops are working, and all aspects of the MRO environment. So it was just a pleasure to work with TRAX on that.

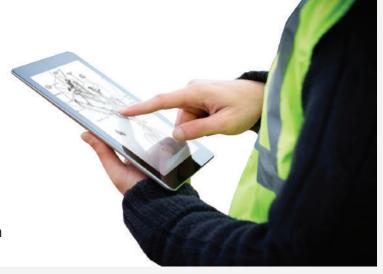
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A huge added value of having an app developed by TRAX is that they access the database and pick up the information that is already there and they just make a new tool out of it.

This is a huge advantage because when you do something in the system in one location then you find it back on the shop control window, it's just all integrated and that's what makes the added value of the Shop Control application.

#### CR: Do you see opportunity for further process improvements?

**SK:** Yes, there is. Right now the Shop Control app is the application which is controlling the flow of work orders or repair orders in our shops. There is already a lot of ideas coming from the shops themselves.

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One of the two greatest possibilities for improvements is to expand the support to the hangar or to the line. We do repair components in the shop, but we also work on work orders or task cards or projects which are directly linked to the airplanes we have in the hangar, or the airplanes that are on turnarounds on the line. So that would be a first potential improvement.

A second improvement is to continue to build on the Shop Control app and make the process in the shops fully digital, because right now we are at a stage where the management of the shop work orders is digital, but the shop work order itself is still a paper package.

The Shop Control app already has the prime features to make that package digital and that would be a very interesting next improvement.

## CR: How has the Covid-19 crisis affected your organization and how has this software helped you?

**SK:** Specifically, at the start of the covid crisis (because now we're getting accustomed to it, obviously), it was a big shock for us because in the cargo industry there was a dramatic increase of operations.



The cargo airplanes picked up the freight left by the passenger belly market and also, they had to pick up all the PPE for the various countries. So we had a dramatic increase in our operation and at the same time we had a dramatic change of working conditions in all our environments.

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Shop Indicators

6-45%

6-100%

100%

Camp. 127

0 days

Action 127

0 days

Throughput

Op/d

Backleg

1 24

Work in Fragress

Parts On Hald

Key Performance Indicators (KPIs) display real-time metrics of work accomplished at the sites. We were affected by quarantine, and we were affected by leaves [vacations] when our employees had to take care of their kids because the schools were closed, etc. So we really had to focus on that.

At our core we had to completely refocus ourselves on just primary operations. For the first six months we did not do any project development or "nice to have" extra things in our duties. We just purely focused on operating and tried to get the airplanes flying. And in that context when you have a software which is supporting you, which is freeing you from doing all this work of analysis such as "where is my part", "what is the status of my part", etc., this is invaluable because you just get right to it, get to the point and get your job done. That was clear.

#### **Demonstration of the Shop Control Application**

**SK:** What you see here is our Shop Control application and what is specifically in front of you right now this is what we call the backlog of parts. We are now controlling the induction of parts into the shop, so we don't just send everything to the shop because the shop is going to choke on that. We have a backlog area where the parts are coming in and waiting for the right time to be released to the shop.

It's almost identical to software for hospital emergency room management, where you come in as a patient and you're going to be reviewed by a nurse who will classify you as a serious case or normal case. tc. According to this you're going to be moved to the doctor's office or waiting room, as opposed to the process we had before would have sent every patient straight to the doctor's office.

Obviously, that doesn't work. The doctor needs to focus on their job and see the right patient at the right time.



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What you see here is this backlog area where the parts are waiting to get assigned to a repair order. What we have done with Trax here is very efficient because the parts are not classified by the time they came in or by the time they are waiting here, they are just classified by their priority and that priority is compiled here.



It's a calculation that we put together with TRAX which is based on the utilization of that part, the amount of parts that we have currently in stock, the amount of parts we have currently in repair, and when these parts are going to make it or not, or whether they're going to have to be on hold for a reason. Based on that the system is constantly calculating what is the next part that you should put into the shop, from top to bottom.

The page is quite intuitive. You see your part, you see where you currently stand with your stock. You see these parts in red, they are currently standing at zero stock, so we know we have an immediate problem with these parts.

If the parts are in stock, we are able to immediately see where they are and what are the quantities. This is a very easy way to get information and then you are able to see what is happening for the parts which are currently in repair, e.g. are they on hold, do I have some open requirements for that part, did somebody order that part, and when is that part needed.

This is what this page is showing, so it's a very useful tool for the shop control planner. That's what we are putting in place right now, we will have a shop control centre with shop control planners in there and the shop control planner will use that list and say "look, my shop can take one more part and that's the right part to send them right now".

We included a manual aspect to it as well, in case the planner needs to make a manual interaction when he finds that a part which is not presented to him as high priority is now actually high priority (this happens a lot). Somebody comes from planning and says "hey, watch out, I need that part for a certain check" the shop control planner is going to be able to go there and move that part to the fast lane and put a note on it. You see that myplanner has already done that, the part is required for Friday.

That's going to be an immediate reminder for the planner that this is actually the next part I need to send to the shop. When the part is sent to the shop, then we are moving to the other tab of the application which is the work list. Here we are looking at the due lists or let's say the work list of the shop or what currently should be worked by the shop at the moment.

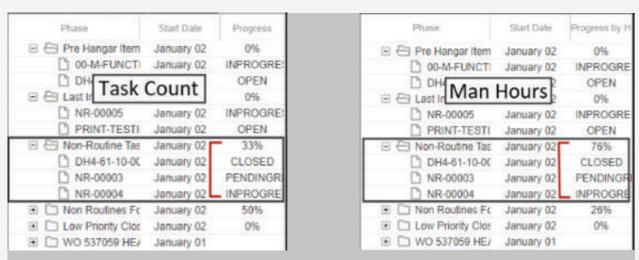


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What is very interesting there is that we designed with TRAX what we call the 'buffer consumption', which is a percentage incrementing with the time that the part is spending in the shop and it's telling us the percentage of time. It shows the amount of time this part has spent in the shop compared to the TAT that you want to have, so it's based on your TAT and based on your due date.

You see the percentages are increasing now, you see that it displays red, and it is a very high percentage. Why? Because we are in the test database and the data gets overdue there.

When the part is just released into the shop and let's say you have 15 days turnaround time, and you are on the first day of that TAT, then your part is going to be displaying green. As the part is progressing along in the shop it's going to move to yellow, then to red, and if it's overdue it's going to be staying red. That provides a uniform priority system.



Option toview the percentage of total tasks completed for the entire phase, or view the percentage of Man Hours utilized of the entire phase.

Everybody has the same priority across the whole organization. That part is at a certain percent of buffer consumption and that defines the priority. When that part is moving to another shop it will go within the list of that shop and the shop will have to do that part according to the global priority level. This was a huge problem for us in the past because we did not have a means to indicate a global priority.



Essentially it was down to all individual shops to negotiate priorities. You know how this goes -- you are from the wheel and Brake Shop and you go to the Paint shop and ask "can you do a couple of parts for me today"? But then the Sheet Metal shop lead is doing the same thing Then you have these discussions which are never ending and which are take a lot of time. But this is all over with that old system because now we assign a global priority to each of the parts and it's the same for everybody and it's controlled by our shop control centre.

I mentioned that we have a lot of AOG parts, so we have a specific category for that. That's what you see on the first line here. When the part is AOG it is displaying full red and it's showing up in front for everybody to see. So that's a clear sign that everybody needs to drop their tools and get on with that part because this part is immediately required to get an airplane back in the air. This is going to be displayed in prominently for everybody. This page is going to be displayed on screens in the shops pretty soon here at Cargolux.

We're going to have big screens with that page displayed so if you get an AOG part, even before the part is coming physically to your shop you know you have something that you need to work on, on a very urgent basis.

I got a little ahead of myself here, so on that work list you see your part, you see the specifics of the work order, you see all the specifics of that part, and then you can see what the priority of that part is, when that part was inducted, when that part is required, what's the remaining duration, and what's the buffer consumption. This buffer consumption is shown on the KPIs on the right there which I'm going to show that in a second.

When we look at the overall buffer consumption in the shop, we can see the current health status of the shop.

If our shop is green, that probably tells me that the shop could do a few more parts now. If the shop is yellow, it is the average condition which should be the norm or shall we say the cruise speed of the shop. If the shop is in the red (and right now it is because you are viewing the test database) everything is overdue. But if the shop is in the red, that tells me that the shop is not going to deliver all the parts on time, so that's a big indicator for management.



Management is basically looking at the buffer consumption and can manage the shop from day to day accordingly. If the buffer consumption is increasing, then that tells me that something is not being delivering as quickly as expected in that shop and that is a very simple indicator which is basically free from any other data. We don't need to put man hours into that, we don't need to put fancy data into that, it's just a due date, a consumption of that due date and we are able to see how that shop is doing.



I moved back to the production database in order to show you the shop indicators. These shop indicators on the right are the critical indicators we figured for our own operation.

We are integrated to the airline, so our mission is to make sure that we fly our planes as much as possible and as safely as possible.

We need to have the parts returning to stock as soon as possible, as well, so these are the KPIs we chose. You see the buffer consumption, the on-time delivery (e.g., is the shop able to deliver on time what was requested at the beginning), what is the turnaround time of the shop, what is the throughput of the shop, and is the shop continuing to release parts into the system. All these KPIs are compiled using the last seven rolling days.

"With the increase of our fleet and the rise in the numbers of components that we are repairing, it was very clear that we need to have a system which shows us an overall priority and progress tracking status on the parts that we are repairing. That is what the Shop Control app does for us."

The app is very interactive. As soon as you have a few days where you say, "I'm not aware" and one of my shops has its main machine broken down and no parts are being released, you know immediately that it will start showing on the KPIs.

Obviously, we're going to be aware of the breakdown. But even if the shop lead would not make us aware of the breakdown, we can immediately identify that the shop has a problem. Then we have an overview of what parts are in the backlog, what parts are work in progress, what parts are on hold, and we can review these parts and see if it's getting out of control.

And the colour of the arrows makes a difference. I'm looking at my pneumatic shop right now which has a workload surge which is shown by the KPIs. You can see the status of parts – backlog, in progress, on hold. They are all increasing to an extent that we just defined this as red. If it would stay stable it would be a horizontal arrow and if it's going down in the right direction, then it would be green.

Now I will show the main page which the shops are using. There are a couple of great features to this page.

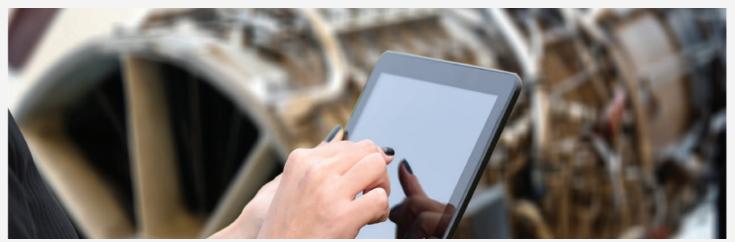
First I need to move back to the test database. There's a couple of great, very easy to use features for the shops, and one of these options is to move parts around the organization.

We came from a system where we took the paperwork, and we brought it to the next shop and then maybe a week later you say, "hey where is that part? Is the part delayed at the other shop? Ok let me check with them".

It's quite difficult to keep track of all these parts, so now what we designed with TRAX is you simply click on the part, select that work order, and click "move to site". Right at the bottom you select which shop you are sending that part to and that's it. The part disappears from your own work list and it appears on the work list of the destination shop. It's going to appear according to the priority list which we described, at the priority level which we described, so it's very powerful.

The big users of this functionality are the NDT and Paint shops. The non-destructive inspection and paint shops don't do parts on their own, they don't have their own capability list, so they don't repair parts themselves, but they do a lot of work for the other shops.

The paint shop paints parts for the other shops. The NDT shop inspects part for the other shops. So this priority list is invaluable for them because they just keep on getting parts from all sites and need easily viewable information on the next priority.



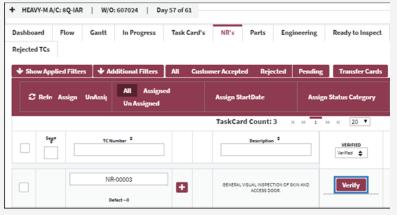
When we move a part to another shop, when we click that "move to site" button, we added a nice functionality that you go into the 'travellers' tab'. Right now I'm in the pneumatic shop and you can see how I move two parts. I move one part to this site and one part to that site, then I can immediately see these parts in these travelers. I know that I'm responsible for these parts, but I have a clear view of which shops I have sent these parts to.

Obviously not all parts are just a straight fix. There's a lot of parts nowadays in the MRO world that are stuck because you need an engineering repair for them. It takes a little bit of time or you need spare parts, and that spare part is not found in the market, or you must wait awhile to get that spare part, or you're waiting on the customer.

Let's say you're waiting on the customer.

The customer has to give you an approval for the quote, so we did not want to keep these parts in the work list (at that stage when the shop is waiting for an external stakeholder) because the shop is not effectively doing anything to that part. When this is happening, we have another process in place where we select that part and put that work order on hold. An example is when we are waiting for parts or tools.





There's a few reasons that you can enter to move parts away from your shop work list but still have them visible in the 'on hold' tab where you have the parts which are stuck for an external reason. That way you will have an overview of these parts as well.

Going back to your list where you can see your part number, you can see your work order, you can see the description of your

reason that part is stuck, and you see how much time since has passed since it was blocked.

That is useful for me as a manager, because if a part is blocked for one year I'm going to say "look, at some point we have to decide something." Maybe that part is BER, or maybe that part needs to be replaced by a new part. So we can see the incremental amount of time that part is on Hold.

If we are waiting on material, we immediately get that material information from the page as well. The information is not populated here now, but you can see the parts button. If you would be waiting for material you would get real-time information as to what you need and when is it arriving. You can manage your status and enter a reminder note .. These two very simple processes of moving parts to another site and putting a part on Hold when you really cannot work on it anymore are very beneficial for the organization because they add so much clarity to the whole operation.

The Shop Control App is giving us a way to decide when the part needs to be sent to the shop for repair, when is it needed & when it has been released. We can track in real time what is happening to that part and thats extremely critical.

I don't remember if I stated at the beginning that we do 10,000 parts per year and that is increasing. This means that every day 40 parts are getting released. It means that at the point we accept all the work orders and all the parts are going immediately to the shops, we have more than one thousand live work orders at a time. So if you have more than a thousand work orders which are always open and which you need to manage, with this process we are able to triage the parts at the induction of the parts.

The work list shows only what you can work on with the right priority. You are putting the parts which you cannot work on

anymore on hold and you are managing these parts in a separate workflow. All of these app functions reduce the working process in the shop and that's the critical thing. The more you reduce the working process, the more you make life simple for the shops and for the people who are working on the parts. That is the name of the game, that's what we are achieving here.

**CR:** That's great! So, Stephane, thanks for taking the time to show us the screens. It's great to see how the information is being used to help your organization to improve themselves.

#### Would you like to share any additional thoughts?

**SK:** I would just like to say a big thank you to TRAX. They took on the challenge of designing something new when we came up with the idea, when we came to them with the specifications. This was

something which was a new project inside Cargolux. It was not clear whether we would succeed with something that works. That took a lot of work from both sides and I really am grateful for that because we have a great tool that we're going to be able to use in the future. And we're going to be able to further develop that tool.

**CR:** That's great, well Stephane, we'd like to thank you for taking the time to share Cargolux success with us!

**SK:** Thanks for having me Chris!



To learn more about the TRAX Shop Control App & the suite of eMobility Apps, contact us at:

TRAX USA CORP www.emro.com sales@trax.aero + 1 305 662 7400