Extending the Reach of MRI with Remote Operations

Bac Nguyen[1]; Lukas Sevcik[2]

[1]ARISTRA, Rasta, Norway
[2]ARISTRA, Dübendorf, Switzerland

Introduction

In times of unexpected circumstances, one needs dedicated approaches and strategies to be able to perform as usual. Due to COVID-19, a lot of private institutes and hospitals are having to change their ways of thinking. One of the most important messages that we'd like to highlight and discuss in this article is that it is possible to provide high-quality examinations without local support.

The key to doing so is a well-connected digital network of specialists. At ARISTRA, our entire infrastructure is based on doctors and technicians in different locations. We have been operating in this way for almost two years now, and we have never had the feeling that we are missing something.

The MRI institutes, where we operate, are widely spread out. This means that, even before the coronavirus restrictions, we sometimes could not set our protocols onsite. We want to highlight some pitfalls and issues that users might run into, and show the solutions we find useful for our work processes.

Scanners at different sites may differ in many ways, even if they look alike.

Examples include:
• gradient strengths
• coils
• versions/releases
• magnetic field strength
• environmental circumstances
• licenses or software packages
• vendors and their specific sequences
• patients/study participants

As you can see, there are many aspects that can bring up plenty of challenges. To make sure our protocols provide the same quality on different scanners, we must keep all of them in mind.
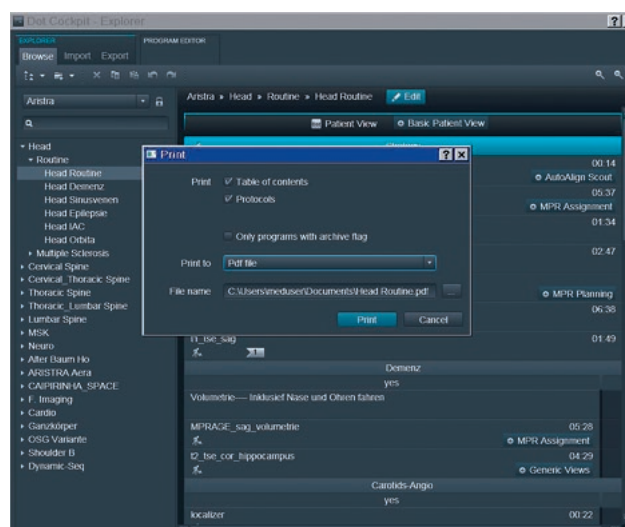
Our approaches

Exporting protocols
When we finish our protocols, we have to export them from the scanner unit. The Dot Cockpit provides a simple solution: just click on the arrow in the 'Export' menu (Fig. 1).
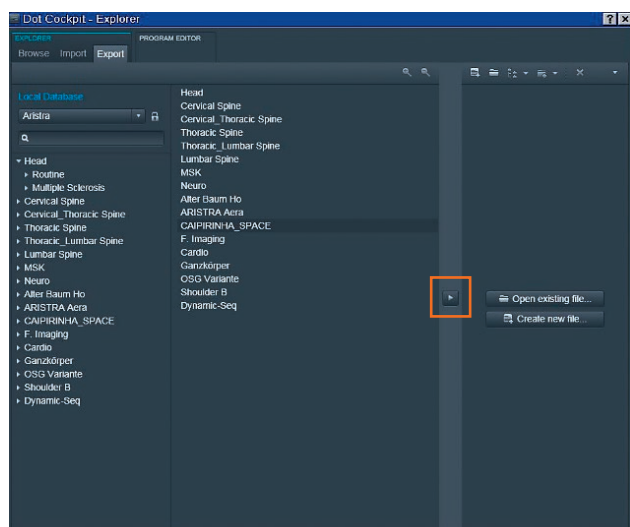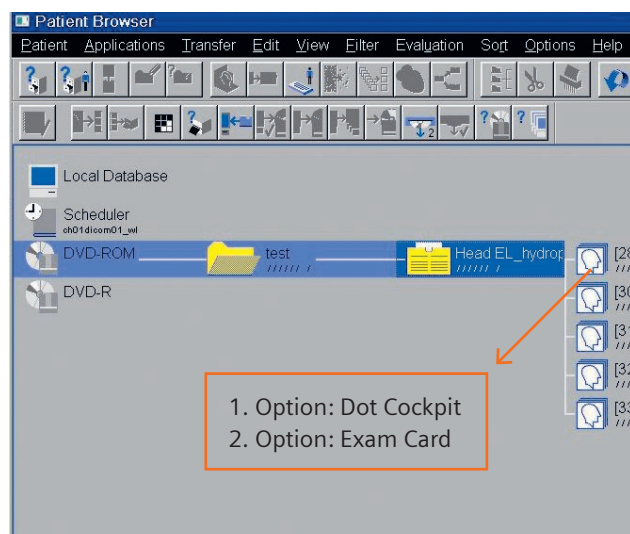

1 Prepare your protocol and use the arrow to export it to your favorite destination.

2 Choose your protocol and use the 'Print' option to export your data as a PDF or XML file.
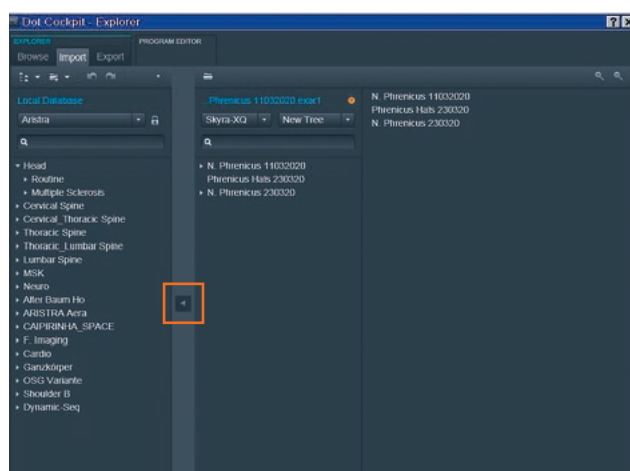
3 Choose your protocol from your source and click on the arrow to tell the Dot Cockpit to import it to your workstation.

4 Choose your sequence and drag and drop it either to the Dot Cockpit or your exam card to scan immediately.
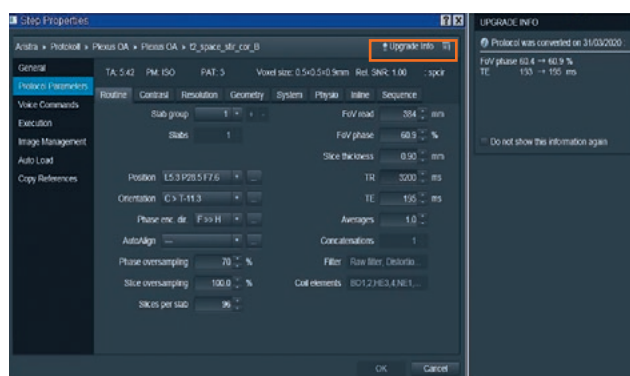
5 Choose 'Upgrade Info' to see the adaptation of relevant parameters.

It also gives you the opportunity to export the finished data as a PDF or XML file (Fig. 2). Our recommendation is to export it as all different file types to make sure that one of them will be suitable for the scanner on which you are about to implement the protocol.

Also, if you have images with your preferred protocol, *syngo*.via gives you the opportunity to export them to a CD or into your PACS. You'll see in the next step why this can be useful.

Importing protocols

Implementing protocols on a workstation can also be done in the Dot Cockpit. You'll find another arrow in the 'Import' menu (Fig. 3).

This can be done easily, but there can also be some difficulties with the scanner/release version. While trying to implement the .edx or .exar file, the Dot Cockpit will show you what the issue is caused by:
- Version/release incompatibility → take the information from the Dot Cockpit and set up the protocols on your scanner manually.
- Hardware incompatibility (e.g., differences in gradient system or local coils) → the system will show a popup window telling you that it is about to transform the sequences in your current system. After this process, you'll be able to see in the Dot Cockpit what parameters have changed (Fig. 5). We strongly recommend checking these parameter changes and adapting as necessary, probably with a sample patient.

If you only have images that you want to implement on your scanner, you can just drag and drop them into your Dot Cockpit or into the queue in the exam card.

Adapting protocols

Parameters can convert due to hardware differences, and these have to be adapted by technicians onsite. Check the mentioned list with changes before you start adapting. Protocols with parameter changes due to conversion are underlined, and can therefore be identified easily. Perform a sample examination to make sure the image quality is the same as before.

Remote approach

In certain situations it can be difficult to achieve the same quality as on the reference scanner. If no application specialist is available, we recommend using Expert-i. This software from Siemens Healthineers provides you with a fully remote workstation.

Another option from Siemens Healthineers is *syngo* Virtual Cockpit. This option allows technologists or radiologists to access the current examination from anywhere in the world. This can be very useful if the technologist needs assistance with difficult cases.

syngo Virtual Cockpit can also be a cost-effective way of teaching technologists remotely, or troubleshooting with application specialists. As Siemens Healthineers says, *syngo* Virtual Cockpit helps you move knowledge, not staff.

At ARISTRA, we do not currently have the *syngo* Virtual Cockpit available on any of our scanners, but this is something we looked into long before the pandemic hit. We hope the *syngo* Virtual Cockpit will be available on our scanners in the near future. This will enable us to maintain our protocols well, teach newer technologists, optimize processes together, and even manage difficult cases without being physically present.

Conclusion

Protocol maintenance can be a complicated process that has to be performed by highly skilled technicians. This is especially true when the hospital has different scanner types and different sites. However, there are ways to make it easier by using remote operating systems and staff. Our solutions show some of the basic approaches.

As institutes and hospitals spread their MRI scanners, there should be improvements in the entire infrastructure. We recommend considering and taking a look at the *syngo* Virtual Cockpit, which in our opinion is a holistic solution for remote maintenance and high-quality examinations.

Contact

Bac Nguyen, BSc, RT (R) (MR), App.Sc (MR)
Senior MR Radiographer
ARISTRA
MRI application Specialist
Rasta, Norway
Phone: +47 97702111
bac.nguyen@aristra.com

Lukas Sevcik
Senior MR Radiographer
ARISTRA – radiology network service
Applications Operations Manager
Dübendorf, Switzerland
Phone: +41764746332
lukas.sevcik@aristra.com