Elekta IntelliMax®
Proactive Monitoring
Reduces Clinical
Downtime for Linac Flight Tube Issues
Elekta IntelliMax® is the software system used to enable system availability and optimization as part of Elekta Care™. It provides capability for securely controlled remote access by the Elekta Care Support Center for corrective maintenance, extraction of machine data for planned maintenance and proactive support for your linear accelerator.*

- More than 80% of our global linear accelerator installed based is currently monitored
- More than 30% of linac product issues are resolved with remote assistance
- Collection of proactive and artificial intelligence-enabled alarms

*Connectivity and the benefits of Elekta IntelliMax requires IntelliMax Agent with restricted internet access to be installed and permanently connected to the relevant systems within the medical facility.
The Challenge: Are flight tube issues difficult to troubleshoot?

Within every Elekta linear accelerator is a flight tube that contains an arrangement of focusing magnets that direct and focus the radiation beam on the target. While a problem with the flight tube is uncommon over the course of a linac’s lifespan, when an issue does arise, it can substantially impede clinic efficiency. Flight tube issues can cause significant clinical downtime and, in some cases, hard terminations, which result in an immediate stop in treatment delivery.

The flight tube’s inaccessible location also makes diagnosing and resolving problems difficult. Without Elekta IntelliMax remote monitoring and predictive support, field service engineers often make several site visits, attempting to fix the problem by replacing other components before finally pinpointing and fixing a flight tube issue.

“Accessing a linac’s flight tube is incredibly difficult, requiring an engineer to remove the covers, treatment head, collimator and lead,” says Chris Flint, Elekta remote command center engineer.

Without Elekta IntelliMax connectivity, the difficulties with troubleshooting and repairing the flight tube impact customers in several ways:

• Beam instability—which can result in clinical terminations and changes in dosimetry measurements

• Downtime—an average of 66 hours of clinical downtime, impacting patient scheduling and wait times

• Organization—coordinating shipments of multiple parts and scheduling for 2–3 on-site engineers per event
Figure 1.
Electrons exit the waveguide and enter the flight tube, where the beam is redirected towards the target. The electrons travel along a slalom path within the flight tube. Three pairs of magnets on either side of the flight tube cause the electron beam to bend through the turns of the slalom. This process positions the beam to strike the target and further focuses the beam to a diameter of 1 mm.

Figure 2.
Here you can see the cross—which is the ‘target’ the x-rays pass through—and the electron window (the circular silver patch).
Elekta IntelliMax remote monitoring continuously monitors the minimum, mean and maximum daily vacuum values at the gun and target end of the flight tube. Alarms are also monitored, which show how frequently vacuum values exceed certain thresholds during a clinical day.

“IntelliMax is monitoring the vacuum data on a per-second basis while the beam is on, and every four seconds while the beam is off. The value of the algorithm is not about a single point in time,” adds Flint. “The algorithm analyzes multiple points in time and reveals trends that uncover a potential problem before it affects system function.”

Predictive flight tube monitoring detects problems early, preventing hard terminations and performance problems and enabling first-time fixes, significantly minimizing disruption to the treatment schedule. When a problem is discovered, service can be scheduled to occur at a time that is least disruptive to the clinical operation.

13 hours of planned clinical downtime decreases downtime by 80%
The Power of Elekta IntelliMax

Wherever possible, Elekta uses IntelliMax to monitor, diagnose and correct issues before they happen to reduce unplanned downtime that disrupts patient care and treatment delivery. Secure remote access to customer hardware or software solutions allows Elekta to provide faster response times through remote investigation and diagnosis by experts, and facilitate over-the-shoulder guidance.

When an event requires an on-site visit, remote access helps maximize efficient use of the engineer’s time by diagnosing the issue in advance.

Elekta continues to expand IntelliMax functionality in existing products and add new products to help eliminate unplanned clinical downtime. We know how important every hour is to your patients, your team, your bottom line. What is an hour worth to you?

IntelliMax is available via Elekta Care maintenance agreements.
To learn more about Elekta IntelliMax

For more information about IntelliMax or other ElektaCare offerings and benefits please visit Elekta.com/elektacare or contact your local sales representative.
For almost five decades, Elekta has been a leader in precision radiation medicine.

Our nearly 4,000 employees worldwide are committed to ensuring everyone in the world with cancer has access to—and benefits from—more precise, personalized radiotherapy treatments.