

INTERNATIONAL ASSOCIATION OF



BAGGAGE SYSTEM COMPANIES

Technology & Innovation Individual Carrier System (ICS)

January 12th 2017

Definition of ICS (Specific to BHS)

- Term for an Individual Device utilized to transport a bag within a BHS System.
- Includes TT; DCV; Tote Systems
- Focus on Tote Based Technology (Tote System)



BHS Challenges that are Influencing Industry Technology:

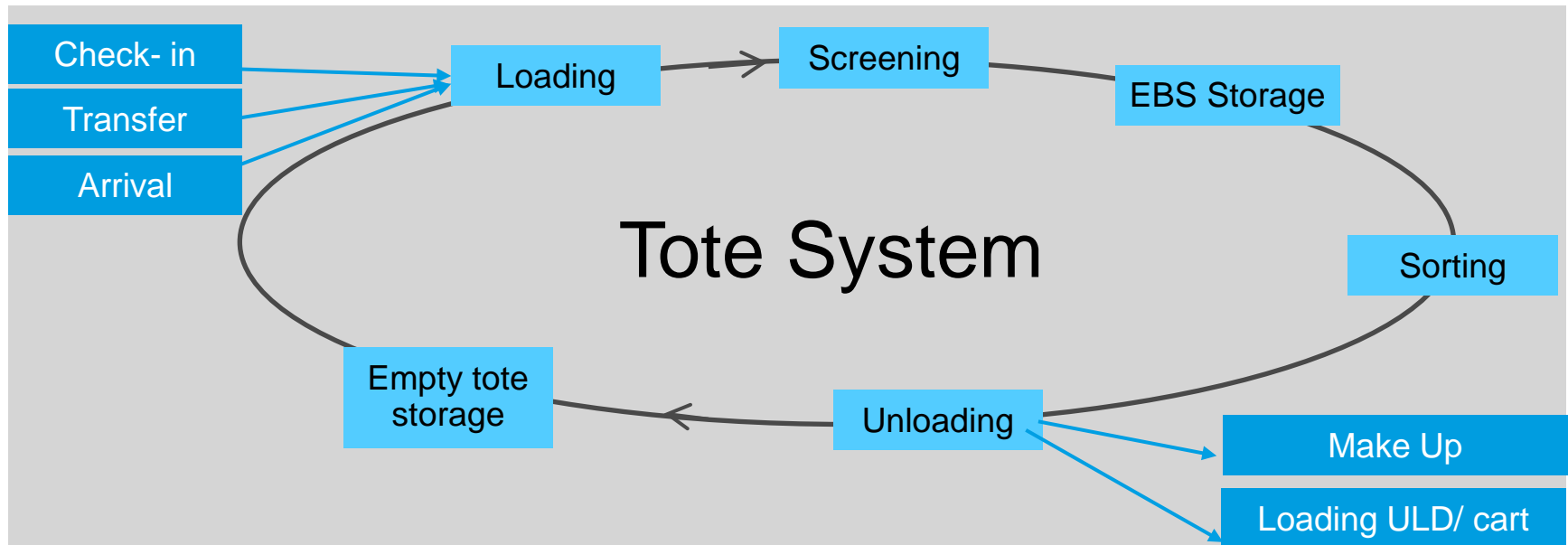
- Difficulty in accurate Tracking Due to:
 - Bags vary Significantly in length
 - Tags are in different locations: Front, Rear, under Bag
 - Skewed presentation to Automatic Tag Readers (ATRs) and Photo Eyes for tracking.
- Straps / Odd Shaped Bags can Provide Opportunity for Jams / Loss in Tracking



ICS Technology Shift

- Great Equalizer: All Bags Relegated to just one Logical Tote Size
- Leading edge to Tag in the exact Same Location Every Time = Best Poss Tracking
- Plug and Play Technology, Simple Fast and Efficient Installation
- In Tote Screening; Provides Flexible EBS Options
- Supports IATA 753 Compliance (White Paper)
- No Encoders; No Gear Boxes
- No Slip Transition; Long Equipment Life
- High Energy Efficiency: Auto Off for the Motor after Each Bag; VFD Control each drive
- **Result:** Less Bag Jams, Less Maintenance, Less Energy Usage

How Does it Work: The Tote System Concept



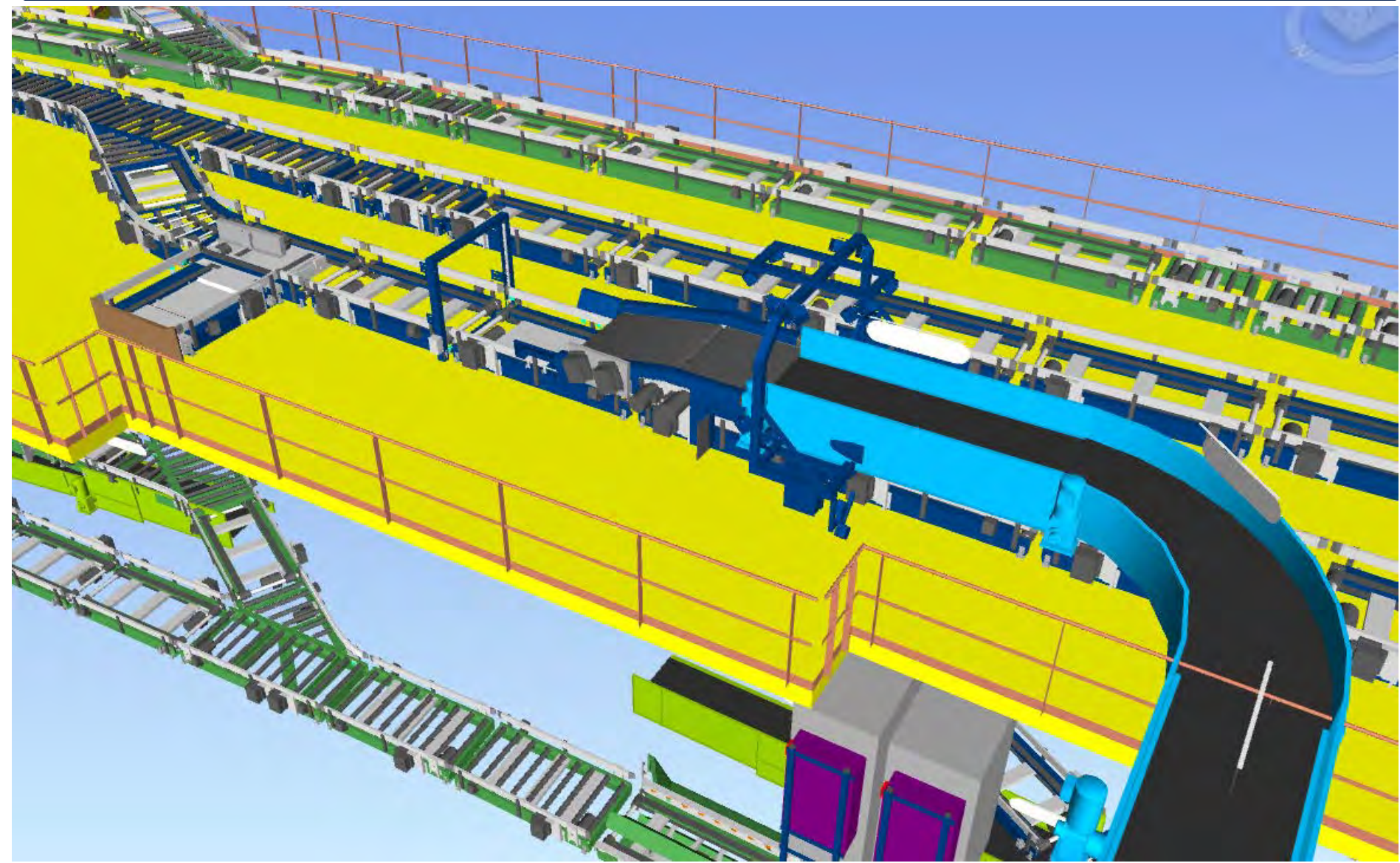
One bag – one tote – One Conveyor Element- Closed Loop System

- Loading after check-in
- Hi Speed Sortation; Screening, Bag Stays in tote; Discharge at Gate Only
- In the Tote As early as possible; Keep in as long as long as possible.

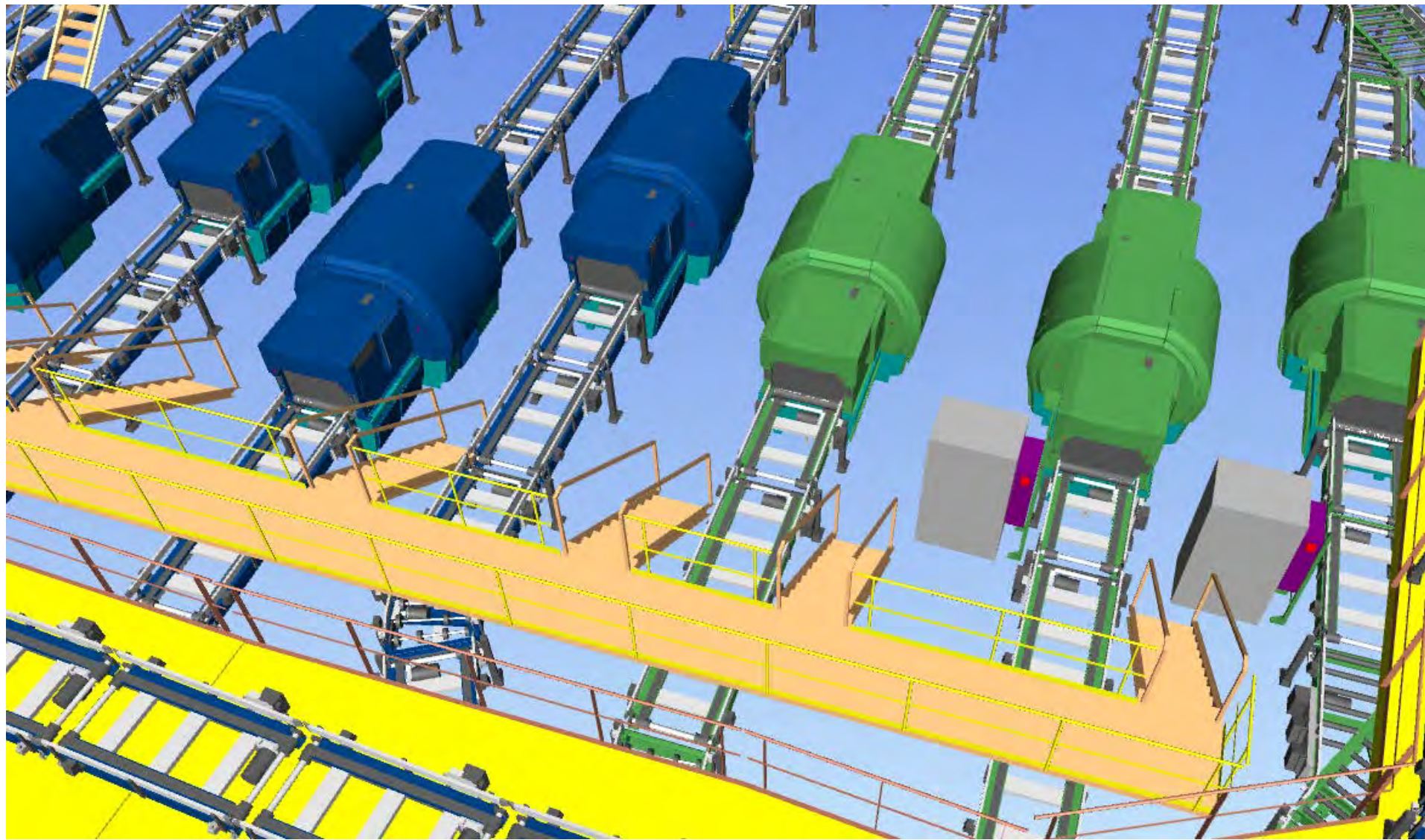
Typical System Layout:

- Standard TC Load Belt; Transition thru the wall
- Bag travels through ATR then loaded into the tote
- Tote is read by a RFID reader just prior to bag loading
- These two data points are married in the Sort Controller
- Once loaded, the tote is tracked by the RFID Tag in the Tote to discharge
- Safeguards are in place for Contour Check after load as well as Divert

- The ICS Guidelines have been included in the PGDS since rev 4.2



IABSC

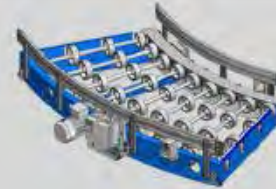




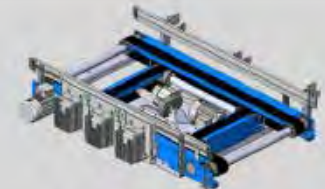
Tote



Transport



Curve



90° Transfer



Divert



Merge



Top-load



Side-load



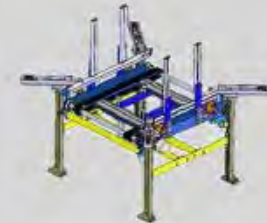
Discharge



Vertical Sort



Walk-through



Stacker

Tote System Features



One bag – one tote

- Accurate Control
- Benefitting from VFD, RFID, an Industrial network to provide smart modular controls
- All straight and inclined conveyors are similar

3-D System with standard modules

- Symmetric tote (no running direction)
- Highest flexibility in layouts



Screening in totes

- Certified for new EU standard 3
- Tote Screening Recently Certified by the TSA for US

Compact features

- Stacking of totes (no recirculation of empty ones)
- Hi Speed Discharge up to 3000 bph
- 90 degree transfer

Most common Loading Methods:

- Dynamic Top loading which is the most common and gives the highest capacity. The bag is loaded while the tote is transported, typically in the 1,800 BPH range.
- Static End loading where the bag is loaded into the tote while it is stopped.

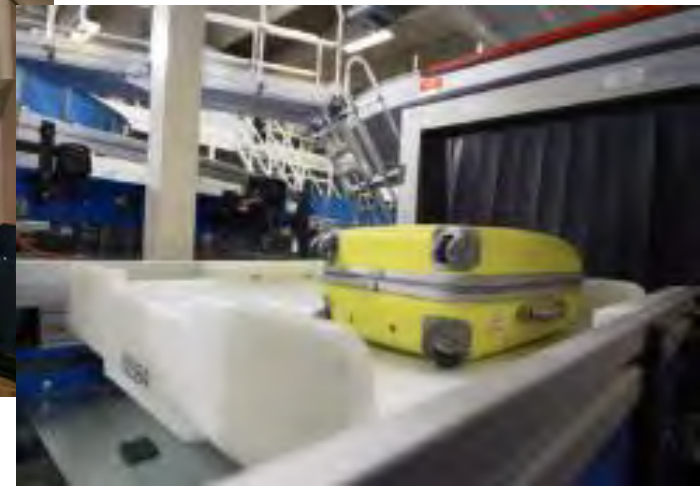


Top Loader



Screening:

- Depending on product and system design the bags either
 - Kept in the tote during the screening, (just recently Approved by TSA)
 - Offloaded prior to screening and then re-loaded at machine exit.



Tote System EBS



- Tracking Rates Provide Maximum Reliability
- Hybrid (Crane and Lane Based) Batch Building
- Most Efficient way to Load ULDs or Carts
- Integrated with Tote System
- Stand Alone Integrated with Conventional Conveyor

Early Baggage Storage (EBS)



High Speed Transporting and sorting:

- Tote are transported on special designed conveyors able to handle the tote.
- Conveyors That are Modular and scalable in design, specifically optimized for efficiency.



1474 FPM (7.5 M/Sec) High Speed Transport Line



Two Methodologies for Discharge:



Dynamic (on the fly)

- High Volume Flow
- In main conveyor line
- Typical Capacity of up to 3,000bph
- Multiple Destinations Same Discharge

Static

- Static discharge – while tote is stopped
- In primary conveyor line or via bypass
- Typical Capacity of up to 1,500bph



Dynamic Discharge



ICS Specific Attributes:

- Speed vs Conventional Conveyor:
 - Typical Transfer Lines = 240-270 FPM
- ICS Sort rate of 452 FPM; High Speed Transport rate of 1,968 FPM (700%+ increase)
- Lifts for Vertical Application
- Multiple Tote sizes available for Standard, OS, and OOG
- Stacker / De Stacker
- Spare Parts reduction can be more than 50% due to like components
- Reduction in Energy Consumption of over 60%

Energy Efficiency: Reduced- Run Time; Friction; Smaller Pulleys



Disadvantages of a Tote based System:

- Tote Length is longer than the Average bag Length (10-12 inches)
- Can be more CAPEX Based on System Configuration
- Multiple Tote Sizes required for Bags larger than approximately 35”
- Maintenance: More efficient, Simpler (plug and play) but this is different technology, thus at least some training will be required.

Advantages of a Tote Based System:

- More reliable bag handling - “uniform” baggage causes near zero bag jams
- Up to 700% Faster transport speeds: Reduce connection / Turnaround times
- Near 100% tracking of baggage data (RFID in each Tote for Tracking/Sortation)
- Higher redundancy and Greater operational flexibility (3D), due to multiple routes to same destination
- Lowest Life Cycle Cost, Reduction in Maintenance and Spares
- ICS is a proven Technology over several decades and supported by all major BHS OEMs

The Tote Based system saves OPEX; Can Reduce O&M Staff by 50%

Complimentary Technology: Video Coding (VC)

- VC Couples Digital Camera / ATR technology together with OCR to allow BSM Data to be encoded while the bag is in motion.
- Saves valuable time and manpower by insuring the bag flow is not interrupted.
- Mobile App allows user to remotely encode from any location.
- Used Very Successfully in the Parcel industry for decades.



References for Additional Information:

- ICS Analysis White Paper 2015 Swanson Rink
- IATA 753 Compliance White Paper
- ICS White Paper 2017
- Siemens Tote Based BHS Solution
- Diafuku Webb Tote Based Solution
- Vanderlande Tote Based Solution
- BEUMER Group Tote Based Solution

Conclusion

Questions on Tote Based Technology?

Available at the BEUMER Group table after the presentations

Thank You!

