



An international aerospace manufacturer chose ATS Bus, the Manufacturing Service Bus, to form the backbone of the data communication requirements of its best practice manufacturing line.

Read on to find out how ATS Bus has improved network resilience and reliability whilst reducing the total cost of ownership.

### A Best Practice Manufacturing Line

An aerospace manufacturer aimed to create a best-practice manufacturing environment that increases production output and allows lessons learnt and the outcomes achieved to be replicated across production lines at multiple sites around the globe.

The targets for the project included the following:

- Integrate shop floor processes with the MES system.
- Automatically capture process data.
- Increase part traceability.
- Track parts through the production process.

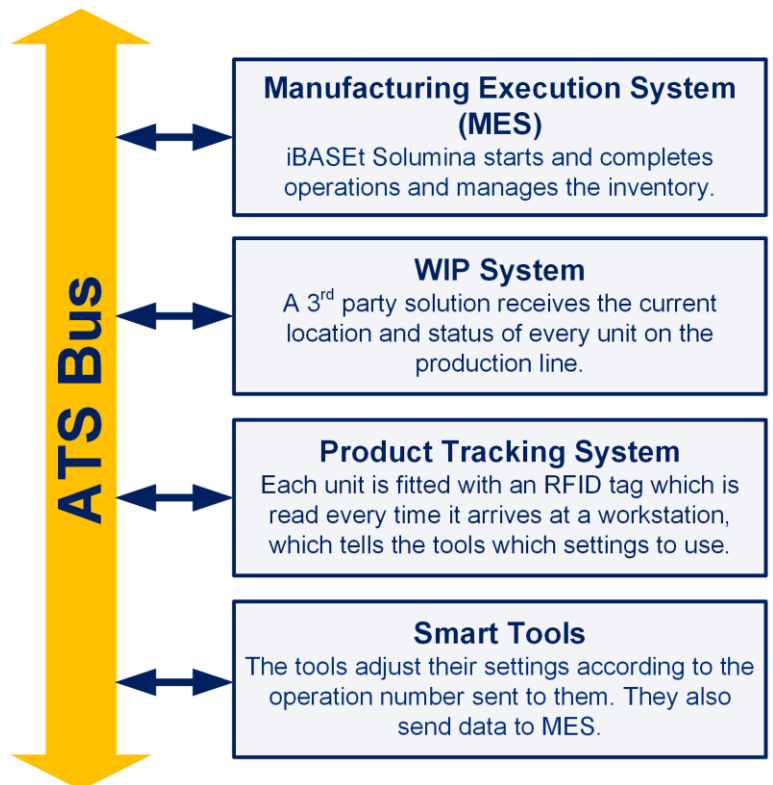
### Integration Using ATS Bus

The first step was to create a bridge between the MES system and shop floor processes. Connecting the worlds of IT (Information Technology) and OT (Operations Technology) can be complicated as they work with data in very different ways with different timescales.

Whereas the MES system (IT) may be interested in what's happening over minutes, hours and days the shop floor processes (OT) are handling data related to minutes, seconds and milliseconds.

To allow data to be transmitted seamlessly between these worlds this aerospace customer implemented ATS Bus.

When systems and equipment are connected to ATS Bus all of the data they generate is accessible by all other systems and equipment connected to it. ATS Bus carries out all data translations and utilizes a publish/subscribe method of data transfer which means that once data is on the bus it can be read by everyone looking for that type of data.



**Manufacturing Execution System (MES)**  
iBASEt Solumina starts and completes operations and manages the inventory.

**WIP System**  
A 3<sup>rd</sup> party solution receives the current location and status of every unit on the production line.

**Product Tracking System**  
Each unit is fitted with an RFID tag which is read every time it arrives at a workstation, which tells the tools which settings to use.

**Smart Tools**  
The tools adjust their settings according to the operation number sent to them. They also send data to MES.

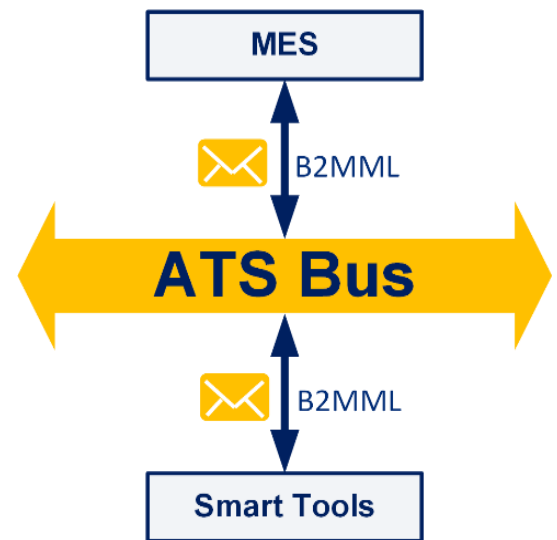
## Communicating Order Data

Order data needs to travel in both directions. Requests need to be sent down to the production line and results need to be sent back up to MES.

The order request is initially sent to ATS Bus from the MES system (iBASEt Solumina) which starts and completes operations and manages inventory.

ATS Bus then translates the order into a standardised message format (B2MML) that can be received by any other equipment or system that's connected. When a smart tool asks for the order data ATS Bus carries out a further translation so that it can be received by the tool.

When an order is completed the process is repeated in reverse. The order completion message is sent to MES, via ATS Bus, together with information about how the order was completed.



## Fully Integrated Smart Tools

The sequence in which Smart Tools are used to perform tasks on each unit is controlled by ATS Bus. Each tool has one or more operation numbers associated to it and is pre-loaded with the settings, such as torque, required for each operation it performs.

ATS Bus knows which operations have been performed on each unit and which operation should be performed next. This allows it to prevent Smart Tools from being used out of sequence or with the wrong settings. When an operation is completed ATS Bus tells the unit which operation it requires next. The appropriate tool is then given the correct settings for the operation.

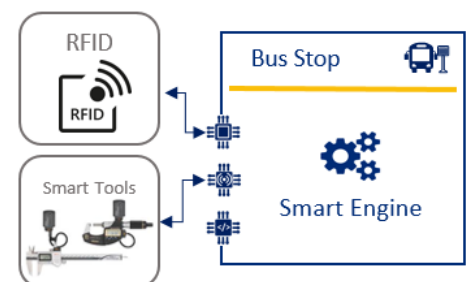
Contextualised data is also collected from each tool and received at the MES system for analysis. Putting context to how and when the data was collected turns it into useful information that can be used in many more ways. In this case the data is associated to the work order.

## Edge Computing

ATS Bus provides the customer with an edge computing solution. This means that real-time data processing, data visualisation, basic analytics, data caching and data buffering can all be performed at the edge of the network, reducing the amount of network traffic, reducing latency and improving network resilience and reliability.

Everything that connects to ATS Bus connects to a *Bus Stop*. Each bus stop is a node that contains a smart engine which can trigger actions whenever a message is sent to or from the bus.

At this customer this happens when a unit arrives at a workstation. An RFID tag reader checks the operation that needs to be performed on the unit. The smart engine in the bus stop then translates that message and sends it the smart torque wrench so that it knows which settings are required. All of this is accomplished without needing to communicate with the MES and use up bandwidth on the bus.





## Unit Tracking

ATS Bus allows every unit that passes along the production line to be tracked using RFID tags. RFID scanners feed the location of each passing unit to ATS Bus which relays it to MES and to the 3<sup>rd</sup> party WIP system so that the real-time location of every unit is known both in the enterprise layer and to the operators on the shop floor.

## Complete data monitoring

The customer can remotely monitor all of the data exchanges carried out across ATS Bus so that it can keep track of the health of its system, monitor for processing errors, send failed messages for reprocessing and make sure that all of its specific environment's needs are met.

## A Complete Connectivity Solution

ATS Bus provides the customer with a complete end-to-end data connectivity solution that improves business continuity by improving network resilience and reliability. It also reduces the total cost of ownership by simplifying the overall connection structure. ATS Bus gives the customer a best practice solution now and a guarantee of best practice for the future.

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