

Use Case Number:	Use Case Name:	Measured benefit per user	Cash value (£)	Is this Cash releasing? Yes / Part/ No	Is this a recurring benefit?	5G Dependence
1.1	AR for training and collaborative design	NCC will be able to host composite training without need to travel to customer site	NCC training course typically retail for £1000 to £5000. Trainers will save on overtime, travel and accommodation expenses conducting training remotely rather than on customer site	Yes	Yes	5G has potential to improve two-way communication functionality capabilities with increased bandwidth and better video/audio quality.
1.2	AR for training and collaborative design	NCC will be able to host composite training without need to travel to customer site	NCC training course typically retail for £1000 to £5000. Trainers will save on overtime, travel and accommodation expenses conducting training remotely rather than on customer site	Yes	Yes	5G has potential to improve two-way communication functionality capabilities with increased bandwidth and better video/audio quality.
1.3	AR for training and collaborative design	NCC will be able to host composite training without need to travel to customer site	NCC training course typically retail for £1000 to £5000. Trainers will save on overtime, travel and accommodation expenses conducting training remotely rather than on customer site	Yes	Yes	5G has potential to improve two-way communication functionality capabilities with increased bandwidth and better video/audio quality.
1.4	VR for remote learning and collaborative design	Ease and immersive enhancement of remote learning experience	NCC training course typically retail for £1000 to £5000. Trainers will save on overtime, travel and accommodation expenses conducting training remotely rather than on customer site	Yes	Yes	Would be required to give a better user experience
1.5	VR for remote learning and collaborative design	Ease and immersive enhancement of remote learning experience	NCC training course typically retail for £1000 to £5000. Trainers will save on overtime, travel and accommodation expenses conducting training remotely rather than on customer site	Yes	Yes	Would be required to give a better user experience
1.6	VR for remote learning and collaborative design	Ease and immersive enhancement of remote learning experience	NCC training course typically retail for £1000 to £5000. Trainers will save on overtime, travel and accommodation expenses conducting training remotely rather than on customer site	Yes	Yes	Would be required to give a better user experience
2.1	Asset tracking in-factory and in-transit	-	£76.5 per job (combined operator + machine cost/h)	Yes	Yes	.
2.2	Asset tracking in-factory and in-transit	With this system, we do not need to order more materials as we can revert back to the old project to check remaining materials in the system therefore utilising stock in the freezer. Composite material has a time limit stored in the freezer before it needs to be disposed of to maintain its mechanical performance after manufacture. We can get better understanding of utilisation of project materials/over or under order because we now have that data in past projects, now we can make informed decision on future forecasting/procuring/repeatable tasks.	Estimated £33k annually	Part	Yes	.
2.3	Asset tracking in-factory and in-transit	.	Estimated £58 K annually (saved spending - cost of wasted stock and out-dated material disposal services)	Yes	Yes - annually	.
2.4	Asset tracking in-factory and in-transit	.	£8k for repair ~£200k for replacement	Part	Yes	.
2.5	Asset tracking in-factory and in-transit	.	Estimated £63.6k annually	Yes	Yes	.

Use Case Number:	Use Case Name:	Measured benefit per user	Cash value (£)	Is this Cash releasing? Yes / Part/ No	Is this a recurring benefit?	5G Dependence
3.1	Real-time data acquisition to better control systems at the machine level during infusion process	.	Recording additional variables has allowed engineers to understand the process better, and has already identified areas in the process where the cost to make each part can be reduced.	Part	Yes	<p>4G appeared to be sufficient for this use case, however there were some small issues around signal strength and connectivity. These would likely be rectified with alterations to the location of the small cells (i.e. an improved network coverage set up in the factory)</p> <p>Note: this use case was performed when there were no other loads on the 4G network. Performance characteristics may vary as other services are attached and capacity is shared, meaning 4G may prove insufficient as this use case (and other use cases) grow and increase the demand on the network. 5G would become essential in this scenario.</p>
3.2	Real-time data acquisition to better control systems at the machine level during infusion process	.	Indirect value - the 3 other benefits identified are achievable on any LRI process in the NCC, saving £££ when re-deploying.	No	No	<p>4G appeared to be sufficient for this use case, however there were some small issues around signal strength and connectivity. These would likely be rectified with alterations to the location of the small cells (i.e. an improved network coverage set up in the factory)</p> <p>Note: this use case was performed when there were no other loads on the 4G network. Performance characteristics may vary as other services are attached and capacity is shared, meaning 4G may prove insufficient as this use case (and other use cases) grow and increase the demand on the network. 5G would become essential in this scenario.</p>
3.3	Real-time data acquisition to better control systems at the machine level during infusion process	.	Around £55 per part, however this would grow significantly if the closed loop LRI system was deployed onto a part that was more complex to manufacture	Yes	Yes	<p>4G appeared to be sufficient for this use case, however there were some small issues around signal strength and connectivity. These would likely be rectified with alterations to the location of the small cells (i.e. an improved network coverage set up in the factory)</p> <p>Note: this use case was performed when there were no other loads on the 4G network. Performance characteristics may vary as other services are attached and capacity is shared, meaning 4G may prove insufficient as this use case (and other use cases) grow and increase the demand on the network. 5G would become essential in this scenario.</p>
3.4	Real-time data acquisition to better control systems at the machine level during infusion process	.	Estimated £555 saving per part	Yes	Yes	<p>4G appeared to be sufficient for this use case, however there were some small issues around signal strength and connectivity. These would likely be rectified with alterations to the location of the small cells (i.e. an improved network coverage set up in the factory)</p> <p>Note: this use case was performed when there were no other loads on the 4G network. Performance characteristics may vary as other services are attached and capacity is shared, meaning 4G may prove insufficient as this use case (and other use cases) grow and increase the demand on the network. 5G would become essential in this scenario.</p>

Use Case Number:	Use Case Name:	Measured benefit per user	Cash value (£)	Is this Cash releasing? Yes / Part/ No	Is this a recurring benefit?	5G Dependence
4.1	Increasing the flexibility of high volume data sensor systems.	.	Total cost reduction for integration = £266,333 Equating to 1.99% of original integration cost.	Yes	No	The addition of 5G to this system allowed for a significant reduction in industrial integration cost as data can be transmitted wirelessly to a virtual processing server rather than requiring expensive cabling installations.
4.2	Increasing the flexibility of high volume data sensor systems.	.	Total cost reduction of robot system = £158,489 Equating to 12.23% of original cost.	Yes	No	The addition of 5G removed the need for a processing PC on the end effector, in turn reducing the weight of the end effector from 45kg to 3.5kg. This meant a smaller collaborative robot could be used that was both cheaper and had integrated safety circuits, leading to a significant reduction in system cost.
4.3	Increasing the flexibility of high volume data sensor systems.	.	Original EE volume = 0.432m3 Use case EE volume = 0.012m3 97.2% reduction	No	No	The reduction of the processing PC meant that the end effector was only the FScan sensor, significantly reducing the size.
4.4	Increasing the flexibility of high volume data sensor systems.	.	Total deployment cost reduction = £398,672 Equating to 11.86% of original cost	Yes	No	The flexibility the 5G adds allows for the system to be deployed anywhere in the workshop that has sufficient signal, without the need to fully reconfigure the data lines. This means that the system can be deployed much faster and at a reduced cost.