**Appendix C - 20200612 FMV Operator Questions V2.1**

**FMV Operator Questions V2.1 Monday, 13 September 2021**

The enclosed questions are those that will be asked at the first of three workshop questioning sessions with FMV operators. The questions and focus groups will be conducted in the following sequence; Pre-employment, ahead of the employment of the agent based tools, to support operators, Deployment - After 1 weeks of operation of the tool, and employment after 12 weeks of operation of the tool.

The tool that is being employed by the operators is loaned from the US and employs convolutional neural network algorithms to classify objects within a full motion video stream. The algorithms have not been disclosed by the US Department of Defence for both security and or IP reasons. The algorithms employed on the system may be re-trained during the duration of the study.

**Pre-Employment Questions**

Questions below will be asked ahead of the employment of the tool. The first set of questions are contained within the Dstl study and will be asked and responded to as part of a broader study.

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| **Pre-Employment Focus Group** | | |
| PE1 | Would you use any automation or tools to support your role? (Glass et al., 2008) | Pre-disposition to the employment of automation and the implications for trust. Managing Expectations – theme 7 Glass. |
| PE2 | Do you use automated tools outside of your role? (Glass et al., 2008) | Pre-disposition to the employment of automation and the implications for trust. Managing Expectations – theme 7 Glass. |
| PE2.1 | What expectations do you have about the tool that you will be employing? (Glass et al., 2008) | Managing Expectations – theme 7 Glass. |
| PE3 | What element of your role do you think could be automated?(van Diggelen & Johnson, 2019) | Team Design. |
| PE3.1 | What processes are in place for your role? | Team Design - Process |
| PE3.1.1 | Do the processes work effectively? | Team Design - Process |
| PE3.1.2 | Do you follow / deviate from the established process? | Team Design - Process |
| PE3.1.3 | Who is responsible for the process and how is it controlled? | Team Design - Process |
| PE4 | What tasks within your role take the majority of your time? | Team Design. |
| PE4.1 | Which are the most challenging? | Team Design. |
| PE4.2 | Which are the most mundane? | Team Design. |
| PE4.3 | “Are there elements of the role that repeat? If yes, tell me what”.(van Diggelen & Johnson, 2019) | Team Design. |
| PE5 | What do you think automated tools could enable you to do within your role? | Pre-disposition to the employment of automation. |
| PE5.1 | How advanced do you think the automated tools will be? (Ramchurn et al., 2015) | Pre-disposition to the employment of automation |
| PE6 | How effective do you think automated tools currently are, which support you within your role? | Pre-disposition to the employment of automation and the implications for trust. |
| PE7 | How would you envisage you would operate with tools? (Hoffman & Johnson, 2019; van Diggelen & Johnson, 2019) (supervisor, tools as an advisor, cue or collaborator) | Team Design. |
| PE7.1 | What impact do you envisage the use of tools will have? (Schraagen et al., 2012) | RPD |
| PE 7.2 | How important is it to you that the tool helps you recognise what is happening the environment? Could you explain to me why this is? (Klein, 1993) | RPD – An expert makes decisions through cues which are matched to the environment. |
| PE7.3 | Do you use past experience within your role? How do you use past experience within your role? | RPD – Is the tool helping them to use their past experience. |
| PE8 | Do you think the processes that you employ and the role that you adopt will change through the use of automated tools? | Team Design. |
| PE8.1 | How will they change? (van Diggelen & Johnson, 2019) | Team Design. |
| PE9 | How will the use of automated tools change the product of the team? |  |
| PE10 | What would motivate you to use automated tools? | Delegating agency. |
| PE11 | What benefits do you envisage you will achieve through the use of automated tools?(Jhim Kiel M. Verame, Enrico Costanza, Joel Fischer, Andy Crabtree, Sarvapali D. Ramchurn, 2018) | Delegating agency. |
| PE12 | What would make you decide not to use an automated tool? (Jhim Kiel M. Verame, Enrico Costanza, Joel Fischer, Andy Crabtree Sarvapali D. Ramchurn, 2018) | Delegating agency. |
| PE12.1 | Would you be content to delegate to the tool; if you would, what would motivate, sustain or curtail your delegation. (Verame et al., 2018) | Delegating agency. |
| PE13 | What beliefs would you have to have in the system such that you would **trust** it? (Falcone. and Castelfranchi., 1998) | Trust and beliefs. |
| PE14 | How should the system display information certainty? What would you want the system to tell you about its certainty? How can the information be **communicated** in an effective manner? (**Transparency**) (Glass et al., 2008; Ramchurn et al., 2015) (**Communication)** (Hou, 2020) | Trust and beliefs – Transparency theme 5  Link to communication and the need for the tool to be able to communicate in an effective manner thereby supporting transparency. |
| PE 14.1 | Information relevance – how important is it that the tool displays information that is relevant? | Information relevance – Tim Norman |
| PE15 | What beliefs would you have to have in the system such that you would **delegate** activity to it?}(Falcone. and Castelfranchi., 1998) | Trust and beliefs. |
| PE16 | How do you envisage the system displaying confidence will influence you?(García García et al., 2018) | The effects of displaying confidence. |

**Deployment Questions**

The questions below will be asked after the initial employment of the systems.

The question contained are broken into six parts.

* D1 aims to get a general view on what they think of the technology and whether the tool met their expectations.
* D2 – 4 looks at the implications on process for the team, trying to draw out what they are now doing with the additional time that the tool provides them. It also seeks to understand the relationship between the human and the tool, finally providing an opportunity to identify if there have been any negative impacts of the tool adoption. This is one of the key areas of questioning as I perceive, the study will identify what is changing within the team as they adopt the tool.
* D6 looks to identify how the tool is supporting their Recognition Primed decision making, here it would be good to understand how the tool conforms to the process of RPD. This section has been expanded considerably.
* D10 draws out what is informing the delegation of agency to the tool.
* D13 looks at what is informing their trust in the system.
* D14 identifies the impact of predictability and the impact of this on their trust in the system.

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| **Deployment Focus Group** | | |
| D1 | Does the system do what you want it to do? | General view of the users view of the tool / technology |
| D1.1 | What isn’t the system doing that you would want it to do? | General view of the users view of the tool / technology |
| D1.2 | What do you think the system is doing in the background? | General view of the users view of the tool / technology |
| D1.4 | Did the tool meet your expectations of how it would perform? (Glass et al., 2008) | Disposition to the employment of automation and the implications for trust. Managing Expectations – theme 7 Glass. |
| D1.5 | Has the tool changed the product of the team?  What has it meant for product assurance?  Are you using the tool to support your assurance processes? How?  What happens when there is a conflict between what the tool is saying and what you, the team, recognise? | Disposition to the employment of automation |
| D1.6 | Has the automated tool met your expectations on how advanced it will be? (Glass et al., 2008; Ramchurn et al., 2015) | Disposition to the employment of automation |
| D1.7 | Is the automated tool sufficiently mature that it can support you within your role? | Disposition to the employment of automation and the implications for trust. |
| D2 | What elements of your role have you been able to automate using the tool?(van Diggelen & Johnson, 2019) | Team Design. |
| D2.1 | Processes  Have the processes within the team changed to accommodate the tool? How have they changed? | Team Design – Focussing on processes. |
| D2.1.1 | Has it changed the way that you as a team operate?  How has it changed the way that you ‘as a team’ are working? | Team Design – Focussing on processes. |
| D2.1.2 | Have you changed the tool to accommodate your process? How has the tool changed to accommodate your processes? | Team Design – Focussing on processes. |
| D2.1.3 | Has the tool saved you time or effort, and in which areas? | Team Design. |
| D2.1.4 | What has the automated tool allowed you to do that you could not do before within your role and as a team? |  |
| D2.1.5 | Has the tool made certain things more challenging? What? Why? | Team Design. |
| D3 | How are you operating the tool? (Hoffman & Johnson, 2019; van Diggelen & Johnson, 2019) (supervisor, tools as an advisor, cue or collaborator) (Jennings et al., 2014) | Team Design. |
| D4.1 | Do you view the technology as a teammate or a tool?(Lyons et al., 2019) | Team Design |
| D4.3 | Do you have more time?  Has it allowed the team do more of the higher level analysis? Can you describe to me how this is?  Do you foresee any problems that will arise from the adoption of the tool?(Yorks et al., 2020) | Team Design  York’s identified through discussion with medical teams that automation was removing the process of reflection for medical staff. |
| D6 | Recognition primed Decision Making (Schraagen et al., 2012)  Relevant Cues - Is the tool providing you with relevant cues? Are the cues that it is providing you right for the situational context?   * ***Is the tool Filtering*** *the cues that are important within the context of the situation* * ***Is the tool Providing*** *the cues that are important within the context and the situation.* | Recognition Primed Decision Making |
| D6.1 | Actions - Is the tool identifying the typical actions to take.   * ***Is the tool Informing of*** *actions to take* * ***Is the tool Providing*** *actions to take.* | RPD – An expert makes decisions through cues which are matched to the environment. |
| D6.2 | Does the tool help you to form an expectations which can serve to check on the accuracy of the situation assessment [e.g. if the expectancies are violated it suggests the situation is misunderstood]?   * ***Is the tool Informing your*** *situation assessment?* * ***Is the tool Providing*** *expectations of the situation against which you can check the accuracy of your situational assessment?* | RPD - Is there evidence that the tool is helping experts to draw on and use their past experience. |
| D6.3 | How does the tool help you to understand the types of goals that can be reasonably accomplished in the situation? What it is that needs to be done in the situation?   * ***Inform*** *the goals that can be reasonably accomplished in the situation* * ***Provide*** *goals that can be accomplished* |  |
| D10 | What motivated you to use the automated tools?  Can you tell me about the things that informed your decision to delegate an element of your role to the tool?  What were the **factors** that you considered? (Verame et al., 2018) | Delegating agency. |
| D10.1 | What **encouraged** you to delegate? | Delegating agency. |
| D10.2 | What **hindered** the delegation? | Delegating agency. |
| D10.3 | What do you envisage will **sustain** the view that you should delegate elements of your work to the tool? | Delegating agency. |
| D10.4 | Did you perceive that the tool shared the same intention as you? Was the tool trying to help you? | Intention – It is critical that tools behave in a way that aligned with the users intention (Hou, 2020) |
| D10.5 | How agile did you perceive the tool was? Was the tool able to cope with changes in circumstance? | Agility – The need for the tool to be able to learn its human partners’ intention, understand the changes in the environment, system status and monitor cognitive load to help the team achieve common goals (Hou, 2020) |
| D10.6 | Did you achieve the benefits that you envisaged you will achieve through the use of automated tools?(Jhim Kiel M. Verame, Enrico Costanza, Joel Fischer, Andy Crabtree, Sarvapali D. Ramchurn, 2018) | Delegating agency. |
| D13 | To what extent do you trust the system? (Falcone. and Castelfranchi., 1998)  **Competence belief** – Do you perceive that the system is competent to be able to conduct the task? **How important is this?**  **Disposition belief** – Do you believe that the system will do what you tell it and is predictable? **How important is this?**  **Dependence belief –** Do you perceive that you are dependent on the systems? **Why?**  **Fulfilment belief –** Do you believe that the system will achieve the tasks set? **Why is this important?**  What is informing your belief that you should have confidence in the system? (Falcone. and Castelfranchi., 1998; Ramchurn, Huynh and Jennings, 2004) | Confidence - Trust and beliefs. |
| D13.1 | What is detracting from your trust in the system? | Confidence - Trust and beliefs. |
| D13.2 | What will be the impact of time? Will you expect that you will trust the systems more or less? Why is this changing? | Confidence - Trust and beliefs. |
| D14 | Does the way in which the system displays certainty influence your confidence in the system, how? (García García et al., 2018; Ramchurn et al., 2015; Verame et al., 2016) | Confidence - Trust and beliefs. |
| D14.01 | Information relevance – how important is it that the tool displays information that is relevant? | Information relevance – Tim Norman |
| D14.1 | How predictable have you found the tool? How difficult have you found it to predict the tool’s actions?  How reliable have you found the appliance? | (Daronnat et al., 2020)The need for predictability (Hou, 2020) |
| D14.2 | What impact has this had on you trusting the system? | Measurability – agents actions must be measurable such that the human can predict whether to trust the systems (Hou, 2020) |
| Trust Score(Wang & Moulden, n.d.) | | |
| D15.1 | The system helps me to do my job more efficiently and effectively | Good  Okay  Needs Improvement |
| D15.2 | I understand how and when to us the tool | Good  Okay  Needs Improvement |
| D15.3 | I have control when using the tool | Good  Okay  Needs Improvement |
| D15.4 | I know that our data is safe when using the tool | Good  Okay  Needs Improvement |

**Employment Questions**

The questions below where asked 12 weeks after the employment of the systems.

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| **Employment Focus Group**  **Focus upon the AI Overlay** | | |
| E1 | Is the AI overlay doing what you want it to do? | General view of the users view of the tool / technology |
| ~~E1.1~~ | *~~Is there anything the AI overlay doing that you would want it to do?~~* | ~~General view of the users view of the tool / technology~~ |
| ~~E1.2~~ | ~~What do you think the AI overlay is doing in the background?~~ | ~~General view of the users view of the tool / technology~~ |
| E2 | Is the AI overlay meeting your expectations of how it would perform? (Glass et al., 2008)  How has this changed?  Has the AI overlay met your expectations on how advanced it will be? (Glass et al., 2008; Ramchurn et al., 2015) | Disposition to the employment of automation and the implications for trust. Managing Expectations – theme 7 Glass. |
| E3 | Can you foresee the AI overlay changing the product of the team? | Assurance |
| E3.1 | Are you using the AI overlay to support your assurance processes? How?  Has the AI overlay changed product assurance?  What would happen when there is a conflict between what the AI overlay is saying and what you, or the team, recognise? | Assurance |
| E4 | Can you foresee the AI overlay resulting in any process changes within the team?  How will they change? | Team Design – Focussing on processes. |
| E4.1 | If the AI Overlay was brought into a live mission, could you anticipate it saving you time or effort when completing challenging tasks? (*If no/limited response – ask if it could save time/effort in completing any task, even basic ones?*)  Which tasks do you think it more suitable for and why? | Team Design – Focussing on processes. |
| E4.2 | Could you foresee the AI Overlay changing the way that you work as a team? |  |
| E4.3 | If adopted on live missions, could you foresee the AI overlay making certain things more challenging? What? Why? | Team Design. |
| E4.4 | How would you describe your relationship with the AI overlay now? Has it change?  (Hoffman & Johnson, 2019; van Diggelen & Johnson, 2019) (supervisor, tools as an advisor, cue or collaborator) (Jennings et al., 2014)  Teammate or tool? | Team Design. |
| E4.5 | Do you foresee any problems that will arise from the adoption of the AI Overlay?(Yorks et al., 2020) | Team Design  York’s identified through discussion with medical teams that automation was removing the process of reflection for medical staff. |
| E5 | Recognition primed Decision Making (Schraagen et al., 2012)  Relevant Cues - Is the AI overlay providing you with relevant cues? Are the cues that it is providing you right for the situational context?   * ***Is the*** AI overlay ***Filtering*** *the cues that are important within the context of the situation* * ***Or Is*** AI overlay ***Providing*** *the cues that are important within the context and the situation.* | Recognition Primed Decision Making |
| E5.1 | Actions - Is the AI overlay identifying the typical actions to take.   * ***Is the*** AI overlay ***Informing of*** *actions to take* * ***Is the*** AI overlay ***Providing*** *actions to take.* | RPD – An expert makes decisions through cues which are matched to the environment. |
| E5.2 | Does the AI overlay help you to form an expectation which can serve to check on the accuracy of the situation assessment [e.g. if the expectancies are violated it suggests the situation is misunderstood]?   * ***Is the*** AI overlay ***Informing your*** *situation assessment?* * ***Is the*** AI overlay ***Providing*** *expectations of the situation against which you can check the accuracy of your situational assessment?* | RPD - Is there evidence that the tool is helping experts to draw on and use their past experience. |
| E5.3 | Does the AI overlay help you to understand the types of goals that can be reasonably accomplished in the situation? What it is that needs to be done in the situation?   * ***Inform*** *the goals that can be reasonably accomplished in the situation* * ***Provide*** *goals that can be accomplished* |  |
| E10 | What is motivating you to use the automated tools?  Can you tell me about the things that informed your decision to or not delegate an element of your role to the AI overlay?  What were the **factors** that you consider when you think about delegation? (Verame et al., 2018)  *Try to uncover what it is that encouraging or discouraging (sustain or curtail) them from delegating to the AI Overlay?* | Delegating agency. |
| E10.1 | Did you perceive that the AI overlay shares the same intention as you? Was the AI overlay trying to help you? | Intention – It is critical that tools behave in a way that aligned with the users intention (Hou, 2020) |
| E10.2 | How agile did you perceive the AI overlay was?  Was the AI overlay able to cope with changes in circumstance? | Agility – The need for the AI overlay to be able to learn its human partners’ intention, understand the changes in the environment, system status and monitor cognitive load to help the team achieve common goals (Hou, 2020) |
| D10.6 | Did you think there would be benefits in using the AI overlay?  Did you achieve the benefits that you envisaged you would achieve through the use of the AI overlay?(Jhim Kiel M. Verame, Enrico Costanza, Joel Fischer, Andy Crabtree, Sarvapali D. Ramchurn, 2018) | Delegating agency. |
| D13 | To what extent do you trust the system? (Falcone. and Castelfranchi., 1998)  **Competence belief** – Do you perceive that the AI overlay is competent to be able to conduct the task? *Good/okay/needs improvement*  ***How important is this****? Low / medium / high*  **Disposition belief** – Do you believe that the AI overlay is disposed to do what you tell it to do and that it is predictable?  *Good/okay/needs improvement*  **How important is this?** *Low / medium / high*  **~~Dependence belief –~~** ~~Do you perceive that you are dependent on the systems, that it is better to rely on the AI overlay than not to relay on the AI overlay?~~  **~~How do you rate this?~~** ~~I am dependant/ I am somewhat dependant/ I am not dependant.~~  **Why?**  **Fulfilment belief –** Do you believe that the system will achieve the tasks set? **Why is this important?** | Confidence - Trust and beliefs.  Good/ Okay/ Needs Improvement  Low/ Medium/ High  Good/ Okay/ Needs Improvement  Low/ Medium/ High  Good/ Okay/ Needs Improvement  Low/ Medium/ High |
| D13.1 | ~~What is informing your belief that you should have confidence in the AI overlay? (Falcone. and Castelfranchi., 1998; Ramchurn, Huynh and Jennings, 2004)~~  What is detracting from your trust in the AI overlay? | Confidence - Trust and beliefs. |
| D13.2 | What has been the impact of time, are you trusting it less or more?  Why is this? | Confidence - Trust and beliefs. |
| D14 | Does the way in which the displays certainty influence your confidence in the AI overlay, how? (García García et al., 2018; Ramchurn et al., 2015; Verame et al., 2016) | Confidence - Trust and beliefs. |
| ~~D14.1~~ | ~~Information relevance – how important is it that the AI overlay displays information that is relevant?~~  ~~Is it doing this?~~ | ~~Information relevance – Tim Norman~~ |
| D14.2 | How predictable have you found the tool? How difficult have you found it to predict the AI overlays actions?  What impact has this had on you trusting the system? | (Daronnat et al., 2020)The need for predictability (Hou, 2020) |
| Trust Score(Wang & Moulden, n.d.) | | |
| E15.1 | The AI overlay helps me to do my job more efficiently and effectively  How important is this? | Good/ Okay/ Needs Improvement  Low/ Medium/ High |
| E15.2 | I understand how and when to us the AI overlay  How important is this? | Good/ Okay/ Needs Improvement  Low/ Medium/ High |
| E15.3 | I have control when using the AI overlay  How important is this? | Good/ Okay/ Needs Improvement  Low/ Medium/ High |
| E15.4 | I know that our data is safe when using the AI overlay  How important is this? | Good/ Okay/ Needs Improvement  Low/ Medium/ High |
| E3.2 | Do you think that the AI overlay is sufficiently mature to be able to allow you to automate elements of your role on live missions? | Assurance |

**References**

Daronnat, S., Azzopardi, L., & Halvey, M. (2020). *Impact of Agent Reliability and Predictability on Trust in Real Time Human-Agent Collaboration*. 131–139.

García García, P., Costanza, E., Verame, J., Nowacka, D., & Ramchurn, S. D. (2018). Seeing (Movement) is Believing: The Effect of Motion on Perception of Automatic Systems Performance. *Human-Computer Interaction*, *00*(00), 1–51. https://doi.org/10.1080/07370024.2018.1453815

Glass, A., McGuinness, D. L., & Wolverton, M. (2008). Toward establishing trust in adaptive agents. *International Conference on Intelligent User Interfaces, Proceedings IUI*, 227–236. https://doi.org/10.1145/1378773.1378804

Hoffman, R. R., & Johnson, M. (2019). The Quest for Alternatives to “Levels of Automation” and “Task Allocation.” In *Human Performance in Automated and Autonomous Systems* (pp. 43–68). https://doi.org/10.1201/9780429458330-3

Hou, M. (2020). IMPACT: A Trust Model for Human-Agent Teaming. *Proceedings of the 2020 IEEE International Conference on Human-Machine Systems, ICHMS 2020*. https://doi.org/10.1109/ICHMS49158.2020.9209519

Jennings, N. R., Moreau, L., Nicholson, D., Ramchurn, S., Roberts, S., Rodden, T., & Rogers, A. (2014). On Human‐Agent Collectives. *Communications of the ACMACM*, *57*(12), 80–88.

Klein, G. a. (1993). A recognition-primed decision (RPD) model of rapid decision making. *Decision Making in Action: Models and Methods*. https://doi.org/10.1002/bdm.3960080307

Lyons, J. B., Wynne, K. T., Mahoney, S., & Roebke, M. A. (2019). Trust and Human-Machine Teaming: A Qualitative Study. In *Artificial Intelligence for the Internet of Everything*. Elsevier Inc. https://doi.org/10.1016/b978-0-12-817636-8.00006-5

R., F., & C., C. (1998). *Principles of trust for MAS: cognitive anatomy, social importance, and quantification, Proceedings of the International Conference on Multi-Agent Systems (ICMAS’98)*. 72–79.

Ramchurn, S. D., Huynh, D., & Jennings, N. R. (2004). Trust in multi-agent systems. In *Knowledge Engineering Review*. https://doi.org/10.1017/S0269888904000116

Ramchurn, S. D., Huynh, T. D., Ikuno, Y., Flann, J., Wu, F., Moreau, L., Jennings, N. R., Fischer, J. E., Jiang, W., Rodden, T., Simpson, E., Reece, S., & Roberts, S. (2015). HAC-ER: A disaster response system based on human-agent collectives. *Proceedings of the 2015 International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*.

Schraagen, J. M., Militello, L. G., Ormerod, T., & Lipshitz, R. (2012). Naturalistic decision making and macrocognition. In *Naturalistic Decision Making and Macrocognition*. https://doi.org/10.1201/9781315597584

van Diggelen, J., & Johnson, M. (2019). *Team Design Patterns*. 118–126. https://doi.org/10.1145/3349537.3351892

Verame, J. K. M., Costanza, E., Fischer, J., Crabtree, A., Ramchurn, S. D., Rodden, T., & Jennings, N. R. (2018). Learning from the veg box: Designing unpredictability in agency delegation. *Conference on Human Factors in Computing Systems - Proceedings*, *2018*-*April*, 1–13. https://doi.org/10.1145/3173574.3174021

Verame, J. K. M., Costanza, E., & Ramchurn, S. D. (2016). *The Effect of Displaying System Confidence Information on the Usage of Autonomous Systems for Non-specialist Applications*. 4908–4920. https://doi.org/10.1145/2858036.2858369

Wang, J., & Moulden, A. (n.d.). *AI Trust Score : A User-Centered Approach to Building , Designing , and Measuring the Success of Intelligent Workplace Features*.

Yorks, L., Rotatori, D., Sung, S. Y., & Justice, S. (2020). Workplace Reflection in the Age of AI: Materiality, Technology, and Machines. *Advances in Developing Human Resources*, *22*(3), 308–319. https://doi.org/10.1177/1523422320927299