Plenary Discussion Notes – Session 4

Fusion and Automation

Q: (to Maure Lohrenz' presentation) Have you identified the need for thinning of point symbols, i.e., decluttering?
A: Yes

Q: The Haar transform will generate artifacts in the model. Different wavelet algorithms are useful for different things. How can you distinguish between measurement errors and natural variation? What kind of wavelets do you apply?
A: Our wavelet expert must answer the questions. Testing and ground-truth is needed.

Q: How do you address issues on orientation?
A: With position error every object gets sampled twice (Sidescan, position error, direction of ship travel); use image processing to turn it in different directions.

Q: How do you distinguish between false negative and false positive detections?
A: The worst of these two wrong decisions is missed detection; here one tries to reduce misses.

Q: What happens when mines look like rocks? On land there are many and old examples of disguised mines.
A: Shape isn't the only thing that determines a mine, it's also density; variation between observations of the same object is also important. A manual process is needed, especially where algorithms report decisions with low confidence, i.e. less than 80%.

C: There is so much variation among humans doing decisions in cooperation with automatic decision algorithms. Users like to override steps and decide, and should be allowed to do so. Detailed HF might often be needed.

C: Introduction of tree-structure with goals and subgoals in relation to data fusion is interesting and in line with early critics of the old established JDL Data Fusion Model.

C: Goal trees are dynamic beasts; some branches will become context-relevant; switch to parts of the goal tree will switch off some aspects of the goal.

C: This fits with VisTG reference model—a multi-level system involving feedback.

Q: What do operators do with uncertainty in case of air picture?
A: We have transponder code to decide if it is a military aircraft or civilian. Code has to correspond with flight plan. If uncertain, we use voice (radio). For air targets, if last element doesn't fit then target becomes unknown, and tactical action has to be taken, like scrambling F16s and F18s to visually identify aircraft. Normally, there is no remaining uncertainty in NORAD.

C: The focus may suddenly change, what was unimportant 20 minutes ago might need extra sensor assets to identify. Sometimes one has to make a decision without knowing. It is a serious situation to have a minute to decide whether the target being a civil jet or an enemy fighter; kill it or let it go?

C: People are not clever dealing with uncertainty. It is a big ongoing issue with presenting uncertainty to people and what they are going to do with it. Remember the USS Vincennes incident (shooting down Iranian Airbus in 1988). Recently a small plane was nearly shot down near Reagan's funeral.

Q: Good decision makers need to see anomalies for detecting new situations -what is the degree of uncertainty the pilot is dealing with?

A/C: We are picked as commanders because we are seen to know what is going on and to anticipate before know; we can live with risk.

Q/C: In automatic air threat assessment, how do we bring the algorithms to the user's attention in an uncertain situation? How do we show what data we have? How can we verify symbols? How do we display this info? There are efforts in the works to combat these issues now!

C: I am excited about the presentations here—take some information out of the commander's head, show it on display instead! Before you make a final decision you need to double check, but there is sometimes risk involved.

C: There may be good reasons for non-decisions. One needs to know the reason for not knowing.

C: A system should be able to tell the operator: "Here is what I know and what I am assuming. The operator could have got a piece of information right, and then to be able to say that assumption is wrong, and what to do with it. Give them a few options of things to do in a sticky situation; allow them to use their intuition to decide which would be the best action.

C: Risk is the product of possibility and consequences. If your decision involves killing people you need 90% or 100% possibility because the consequence is so high. If the consequence is less, you can act on a lesser possibility chance.

C: At some point the two meet—the impact (consequence) increases and the knowledge to detect the possibility should also be increasing until a decision has to be made.

C: Risk may increase as you delay a decision. If new information is not expected, why not make decision sooner? Focus on the things that you can do something about.

C: Visualization + mental picture will never have a 100% solution.