Sudoku of teamwork

By Maciej Szczukowski

I've never been a fan of a Japanese game called Sudoku. I've always felt that the "need" to fill in a form with a scheme of numbers is fully satisfied by completion of my yearly tax returns and I don't need to bother with any complex calculations, even if only for fun. A few weeks ago though, the circumstances of a rather dull meeting pushed me into trying it.

The first attempt took me some time but the subsequent ones began to raise me above the "rookie" level. I found myself switching from a narrow consideration of only 9 fields (aviation experts might call it tunnel vision) to a broader perception of blank or already-filled in little boxes, all 81 of them. After a while, I could see that, actually, there is a certain system to it. And although it doesn't lead to an instant solving of each puzzle, I found that using memory or concentration tricks could make the game more fun and less of a calculation challenge – in effect less stressful.

On 1 November 2011, I had a morning shift at Warsaw airport tower, which was supposed to terminate, with no adventures, at 2.30 p.m. It was the only day of operational work during my new rating course (which had lasted for about 40 days). And then in the very last hour of this shift, with me on TWR position, unexpected news about LOT 16, a Boeing 767 inbound from Newark which eventually landed wheels-up, reached the tower. I am still wondering if I had no luck or all the luck in the world that I was at the tower at the time …

Why am I writing about these two – a simple game and a complex aircraft emergency? What do they have in common? I would say that it is the problem of choice when no definitely right answer is apparent. Sudoku may sound trivial here but that is something that really fascinated me when I started playing. The rules are clear, the "game plan" is simple – just like procedures or operational instructions are (or at least should be). In Sudoku, you select relevant information, compute it in your brain and then,

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finding out that you can use three different numbers in a certain field, have to either look for more information which will lead you to the correct action or … resolve the problem by risking a particular decision which may not actually be correct and accepting its consequences for the rest of the game.

Flying in a multi-crew environment or providing ATC is surely a "teamwork" activity. Sudoku can be teamwork as well, with a bunch of friends standing behind your back saying "you should put number 2 there" or "look, this one is easy" But in all these activities there are always moments in which you, and only you, have to make a decision which may have an uncertain outcome, in other words, take a chance. That is the moment which you may have to solve your problem. The Captain of LOT 16, though he took over an hour to try to deal with the situation with the help of the crew, eventually made an approach with the gear up. It was only he who could decide. It was also only he who was then and remained afterwards responsible for the decision.

An air traffic controller cooperates with his colleagues in, for example, establishing certain spacing minima on approach but when it comes to making the decision whether or not to fit in a departure between two landing planes, it is an individual controller who has to solve the problem. At that very moment only this particular decision counts. And if anything goes wrong, it is the controller who will have to answer the questions "why" and "what for". Not the team as a whole.

When I recall the day of the LOT 16 belly landing, I end up thinking about all the people involved in trying to help find the best possible outcome to the shared problem. Probably all the available manuals were open at the right page and checked, both in the air and on the ground. Everybody was trying to recall their simulator and ground school training sessions for ideas. All of us were trying really hard to take

a broad view of all the 81 fields of our airfield-airspace-Sudoku board and gather as much information as possible from the fields already filled in. It was the teamwork we were trained to do.

However, I think that such an attitude, though widely accepted, leads to us missing an important point – our self-confidence. Many will agree that the "top ten" list of distress situation terms includes "coordinate", "cooperate" and "collaborate". I am sure that there is nothing wrong with that. We receive lectures and do exercises in communication, partnership and team actions but actually none of them mention confidence, self-esteem, self-respect or simply faith in, and pride in, our own decisions. In effect, and many situations prove this, we sometimes forget about the thin line between the time for cooperation and the moment of an individual decision and with it, awareness of its importance and consequences.

Now the question is where is this line between the common mind of a team and the single mind of a responsible pilot or controller? I recall one of many situations where this line was not defined. On 19 February 1996, a Continental Airlines DC-9 performed a gear-up landing at Houston. Part of the background to this outcome is that "the first officer was unwilling to overtly challenge the captain's decision to continuing the approach" though "he did attempt to communicate his concern […] to the captain" (by asking few times "want to take it around?", "want to land it?" and "you want it?")[1]. It has been found, based on research, that the only value of challenging by monitoring pilots is to recognise hazards that flying pilots have missed; however, this ignores the value of independent thought and assessment by the monitoring pilot, and the potential ability of the monitoring pilot to influence the flying pilot's decision-making through the power of suggestion.[2] Likewise it is now known that an individual may forget or incorrectly remember even recently acquired information, so that new information resembles other information processed recently.[3] The last case definitely happens during intense teamwork, where the pace of information exchange may be high whereas individual thought processes, no less important after all, are unknown to the group.

A few weeks ago I played a game during a TRM (Team Resource Management) session, in which a group of people had 30 minutes to make a complex decision. For the first 15 minutes, I was quite passive and saw that, although almost all the members of the group had a chance to talk, the group itself was not able to get any closer to the decision. After 15 minutes I decided to send a rather explicit message to the group and within the allotted time we came to a conclusion. Yes, it was only a game but still, though some of the opinions about my intervention were not pleasant, our lecturer told us that if the leader had not stopped the unproductive part of the process, if a single mind had not guided the team and its actions, we would have demonstrated more or less correct teamwork but had no real product. In other words, nothing.

The now very well known "ASSIST" scheme contains the letter "T", which means "time". I think it is a guide but also proof of the fact that we, as a team, need not only to work with each other but also to give each other time to work on our own thought processes. This is not contrary to teamwork. It is to ensure that team members are effective contributors. And if we do not care about our own contribution, the team itself may not have enough time to act or may simply not see that their help is needed. This is, of course, true not only for emergency situations. And it was not only the first day of November 2011 that taught me this. Somehow, every game of Sudoku I play reminds me about it too. ⑤

1- NTSB Aircraft Accident Report, NTSB/AAR-97/01 "Wheels-up landing Continental Airlines Flight 1943, Douglas DC-9 N10556, Houston, Texas, February 19, 1996", pages 4 and 56 http://www.ntsb.gov/doclib/reports/1997/AAR9701.pdf

2- Fischer, U. and Orasanu, J. (2000). "Error-challenging strategies: Their role in preventing and correcting errors." In Proceedings of the International Ergonomics Association 14th Triennial Congress and Human Factors and Ergonomics Society 44th Annual Meeting, Santa Monica, CA.

3- Brown, S.C., and Craik, F.I.M. (2000). "Encoding and retrieval of information", The Oxford Handbook of Memory (pages 93-107). New York: Oxford University Press.