Informing the Evaluation of *Can You See Me Now?* in Rotterdam

Runners' and Control Room Work

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1. <u>Background to the Study: Orientation to Evaluation</u>

Can You See Me Now? (Flintham et al. 2003) is a mixed reality mobile game where online players are chased and captured by runners located on the physical streets of a city, in this case, in Rotterdam.[1] Interaction between players and runners is supported behind-the-scenes by control room staff, who are responsible for managing the technology and (wherever possible) any troubles that occur. The purpose of this study is to inform a broad evaluation of the game's deployment in the wild, in contrast to in a controlled environment such as the laboratory, for example. Various strategies are employed to evaluate *Can You See Me Now?* ranging from statistical analysis of computer logs to ethnographic observation of the game's production, which is the particular focus of this report.

'Ethnography' is an observational approach to social research that requires the immersion of a fieldworker in a setting sufficient reach a detailed understanding of the work that goes on there prior to standing back and making a more detached analytic assessment. It is one of the oldest approaches to research in the social science armoury and over recent years has come to prominence in computer science as a 'method' supporting analysis of the social circumstances of technology use. The notion that ethnography is a method, while useful, is a gloss on a certain set of analytic concerns however (Shapiro 1994), which are often set aside or ignored by computer scientists who wish to appropriate observational techniques to inform their work.[2] At the most general level, and in the context of computer science and systems design, ethnography's analytic concerns might be described as to do with the social construction of technology. That says little in itself, however, as the term 'social construction' is bandied about by many competing analytic perspectives in the social sciences. The concern with the social construction of technology here is with the collaborative actions of participants involved in the playing of *Can You See Me Now?* More specifically, the concern is with collaborative action as performed by participants; with the performative details of collaboration; with collaboration as it is *done* in real time by participants.

This is an empirical analytic that sets the traditional social science concern with theorising to one side and proceeds instead through careful description of the lived work of collaboration. The purpose of carefully describing the lived work of collaboration is to explicate or make visible the identifying features of the game – i.e., the embodied

collaborative features of the game that make it the unique game that it is and not chess or cribbage, say (Garfinkel 2002).[3] Accordingly, analytic attention is paid to

- 1) <u>just what</u> activities participants together engage in, in the course of playing and producing the game,
- and 2) to <u>just how</u> participants order or organize the use of technology in their collaborations, and so configure the technology-in-real-time-action to meet the requirements of the activities that they are together engaged in.

It is taken as a foundational analytic principle that the collaborative activities participants engage in to produce the game and the orderly ways in which they organize technology usage to meet their collaborative needs are identical to the ways in which they assemble, build, put together, and otherwise socially construct technology usage to meet the practical purposes to-hand: namely, the 'playing of the game' in this case.

Focusing on the performative accomplishment of the 'playing of game', evaluation of *Can You See Me Now?* might be said to proceed here then from a praxiological point of view on social constructionism (Crabtree 2003).[4] Nothing is posited beyond the lived work of the game's production as made available in the collaborative actions of participants. No external 'factors' are appealed to or invoked to account for the social construction of the technology. The social construction of 'the game' is replete with its own orderliness furnished in embodied, performative details of its participants' collaborations, which are the topic of this report.

2. <u>Situating Analysis</u>

Although *Can You See Me Now?* takes place 'online' - i.e., via electronic media including a virtual environment, the internet and mobile devices - it is nevertheless a situated experience. The game takes place somewhere, in places concrete, real and tangible, which have consequences for the production of the game. Below we briefly consider <u>just where</u> the work of the game was situated before moving on to consider that work in detail.

The Runners' Place of Work

The runners were situated on the streets of Rotterdam. Their place of work consisted of buildings (cafés, hotels, warehouses, restaurants), car parks, streets, alleys, road junctions, pavements, streetlights, pedestrians, cyclists, and cars travelling in directions.

Figure 1. The runners' place of work: 1) The streets of Rotterdam.

The runners' place of work was not unbounded. Their place of work was not Rotterdam as whole but a circumscribed place, a delineated space consisting of two streets, a seafront walkway, three car parks, and number of other discrete sites, which were represented along with the runners movements via an abstract map to provide a shared frame of reference and workplace for the online players.
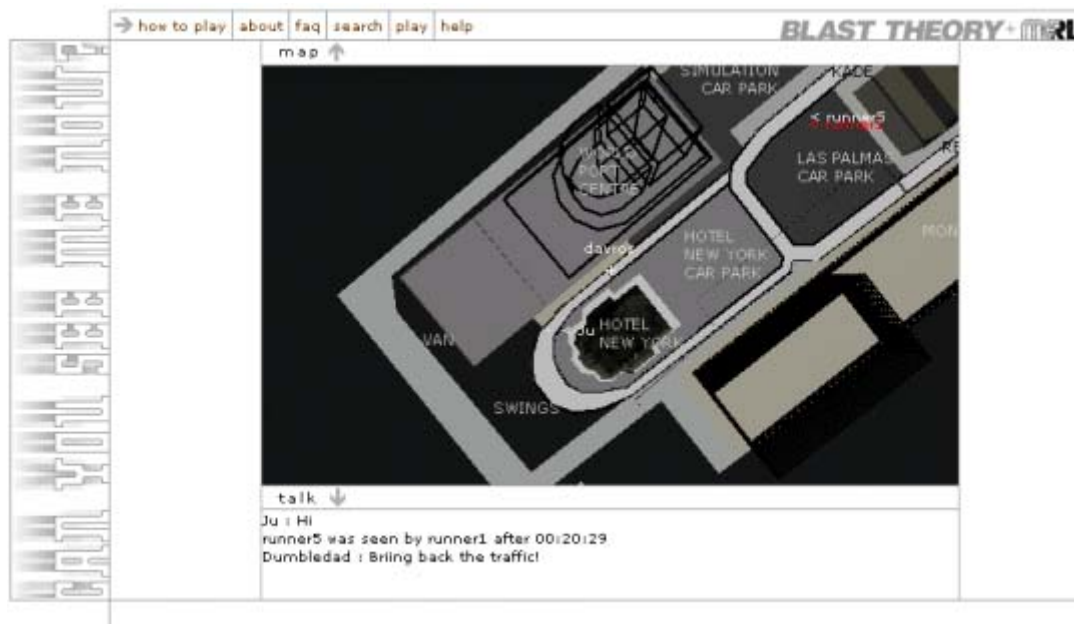
Figure 2. Representing the runners' place of work to players (creating a shared workplace).[5]

It is notable that in the real world this delineated space was 'alive' – i.e., it was inhabited by wild contingencies occasioned people going about their daily business. People having no direct relation to the runners, and no representation in the virtual game space, were nevertheless present and contingently related to the runners by their location, direction and transit through the real delineated space. People walked the streets, alleys and walkways, they cycled around, and drove cars up and down as the runners went about playing the game and so the daily work of the streets intersected with the runners' work. These contingently related 'goings on', while not a formal feature of the game, were *scenic features* of the runners' place of work in which the runners' interface to the game was practically *embedded.* Consequently, in the course of playing the game the scenic features of the street, like the physical fabric of the streets, had to be taken note of and managed moment-by-moment as the game unfolded, especially if collisions and other accidents were to be avoided.

The runners' gameplay interface provided an abstract virtual overview of the delineated space and allowed runners to 'zoom in' on particular locations within the delineated space. The interface was located on a Jornada or PDA and also furnished runners with information running along the top of the interface from left to right concerning GPS accuracy in terms of metres, the strength of network connectivity in terms of percentage, and the number of players. Text messages sent between players and to runners were

displayed at the bottom of the interface. Runners communicated between one another via walkie-talkie and their talk is broadcast to players. The walkie-talkies could also be used to talk to control room staff.
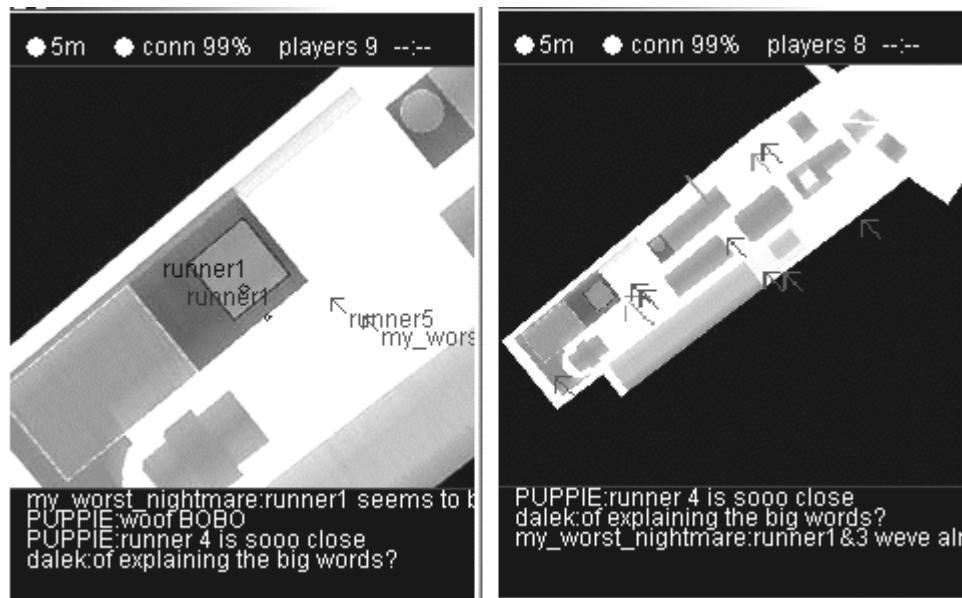

Figure 3. The runners' place of work:
2) The interface - zoom in (on left) and overview (on right).

When we examine the runners' work, analytic emphasis is not placed on what goes on at the interface. The classical concern of Human-Computer Interaction (HCI) to understand interaction in terms of the users' relationship to the computer at the interface is replaced with a concern to understand interaction in terms of the interface's embeddness *in its places of use*, in this case out on the streets. The analytic lens is inverted then (Grudin 1990),[6] and the focus instead is on how the computer interface comes to be practically implicated in the performance and accomplishment of the collaborative work that goes on at various concrete sites in a setting (Bowers and Rodden 1993).[7]

The Control Staffs' Place of Work

Playing the game, like any game, is a moment-by-moment achievement. Unlike many games, however, *Can You See Me Now?* relies on constant behind-the-scenes orchestration. It is a technologically mediated game and so it requires a technical staff to make the playing of it possible in the first instance and to maintain gameplay in the second instance. The game's technical staff were located in a place of their own - the control room – which was physically separate from but intimately connected to the runners' place of work in ways

which will be explicated over the course of this report. The control room consisted of four discrete sites. 1) A site where technical staff could configure and monitor the 'mechanics' of the game. This site consisted of a number of interfaces to a) the game server; b) the runners' mobile devices; c) the game overview; d) gameplay queuing and the audio stream; e) the gameplay interface; f) GPS, wave LAN, audio input, and database logging; and g) the network. 2) The team leader's workstation. 3) Workbenches for maintaining and repairing kit. 4) A site for the runners' gear which was organized for particular runners (i.e., the gear was laid out to reflect which items belonged to which runner).

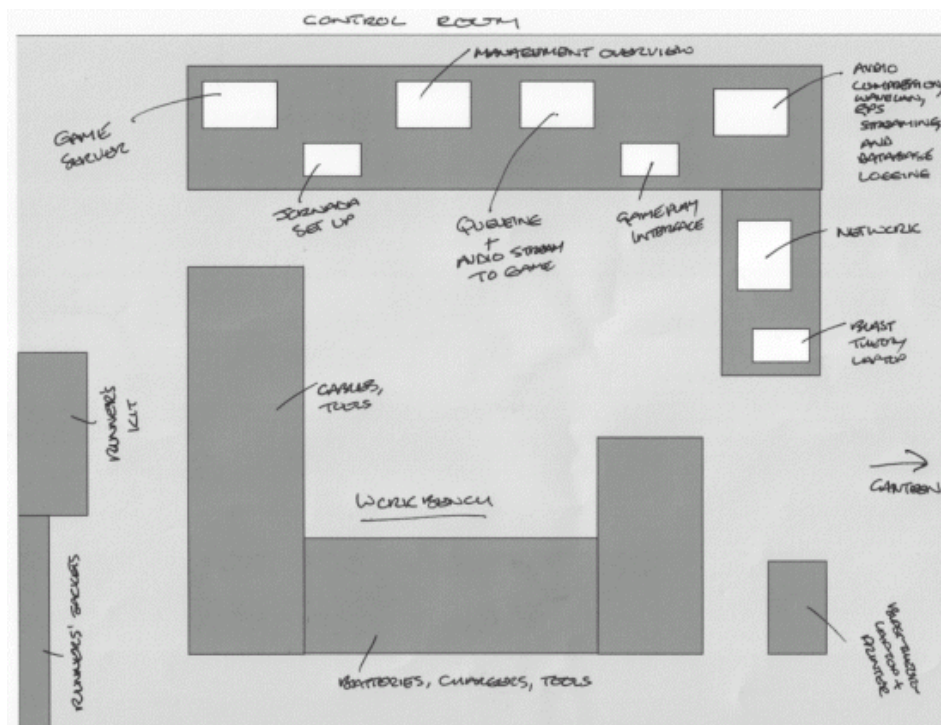**Figure 4.** Control staffs place of work: the control room.

Figure 5. Layout of the control room.

As with the runners' interface to the game, each of the interfaces at control room staffs disposal will be considered in terms of the ways in which those interfaces are embedded in their collaborative work, both with one another and the runners.

3. The Embedded Character of Runner and Control Room Interfaces as Given in the 'Just What' and 'Just How' of the Day's Work

As the title suggests, this section of the report explicates the embedded character of the various interfaces involved in the game's production in identifying details of the day's work. The day's work was recorded on video, which allows us to examine the work in detail. We start by examining the runners' work on the streets before moving on to consider work in the control room.

Embedding the Virtual in the Streets

It is a fundamental and unavoidable feature of the game that play relies on the runners' ability to embed the virtual workplace in their real workplace – i.e., in the streets – so that runners can see the sense of players' actions: see which direction they are heading in, where their movements might lead them, and project points at which they might be intercepted. Below we consider what it means to 'embed the virtual in the real' as a job of work. The purpose of this is not simply to understand the achievement as a job of work but rather, to explicate the *embodied skills* or *competences* involved in embedding the virtual in the real. Although the vignettes presented below often focus on a single runner at a time, it is important to appreciate that the runner's actions are essentially collaborative. They are actions occasioned by and in response to those of another: namely, a player.

Below we describe sequences of the runners' work drawn from both afternoon and evening sessions to explicate the embodied skills and competences involved in embedding the virtual in the real. We first join runner 2 just after he has caught a player, which consists of taking a digital photograph of the location at which a player is caught, and he is now reorienting to the game:

```
Runner 2 on walkie-talkie: This is runner 2. I'm back in the game
and I'm looking to chase Jules.
```

The runner looks at the jornada and turns his whole body, moving the jornada around with him, to face his left. This bodily movement allows the runner to *align* the virtual workplace with real workplace and so 'plot' his current gameplay coordinates in relation to Jules. This

physical alignment and coordination of the virtual workplace with the real workplace furnishes or 'points' the runner in the direction he needs to travel in to intercept Jules.

Figure 6. Working out the way to the next player: aligning the virtual with the real.

Having plotted intercept coordinates, the runner sets off inland across the carpark in front of him, consulting the jornada as he goes in order to maintain a fix on the player and to see changes in the player's trajectory that effect his current course of action. The runner comes to a road and attends to the hazards of the street before crossing. He consults the jornada again, turns to his right and heads off down the street. He slows down, looking closely at the jornada.

    Runner 2 on walkie-talkie: This is runner 2. I'm on Wilamena
    looking for Ceewood.

The runner taps on the jornada interface to zoom in the map. He looks at the map *and* around the immediate vicinity of the streets in which he his located. He then taps the interface again to zoom out, turns to his left and runs off down a side street.

    Runner 2 on walkie-talkie: This is runner 2. I'm proceeding south
    through Startun out onto Otto. There's a player out on Vern, I'm
    going that way.

The runner slows his pace as he nears the end of the street and pauses momentarily to coordinate his actions with street traffic that he can hear coming along the road in front of him, and whose pathway he projects.

Figure 7. Coordinating action with the street's hazards.

The runner's coordinational timing is fine-grained and precise and he runs across the road just as the hazard passes by. At the other side of the road he stops briefly and checks the jornada again before racing off up the street to his left. He arrives at a carpark at the top of the street and then slows down.

```
Runner 2 on walkie-talkie: This is runner 2. I'm into Vern now. I
can see Jules and Mike heading into Edam. I'm going to leave them.
I'm looking for Tommy.
```

The runner heads off to his left onto the road consulting the jornada as he walks along. He is still looking at the jornada as he steps out into the road to cross it. He looks to his right as he moves to cross the road and quickly takes a step backwards to avoid the street's oncoming hazards, which at the same time take action to avoid collision with him.

Figure 8. A momentary lapse of attention.

After the hazard has passed by, the runner crosses the road and heads up the street to his left where he stops, 'waiting for an update'. Runner one is located a little further down the street:

```
Runner 1 on walkie-talkie: Runner 2 what is your current situation?
Runner 1 on walkie-talkie: Runner 2, do you have GPS and
connectivity at the moment?
Runner 1: He's got GPS.
Runner 1 on walkie-talkie: Runner 2 there are currently a lot of
players in Los Palmas carpark.
```

Runner one sets off in pursuit of the players. She runs across Los Palmas carpark consulting the jornada as she goes, stopping, consulting the jornada again, correlating real and virtual positions and moving off in a new direction accordingly. Her movements are not random but make a triangular sweep pattern visible. Her movements elaborate an embodied sweep strategy for locating players.
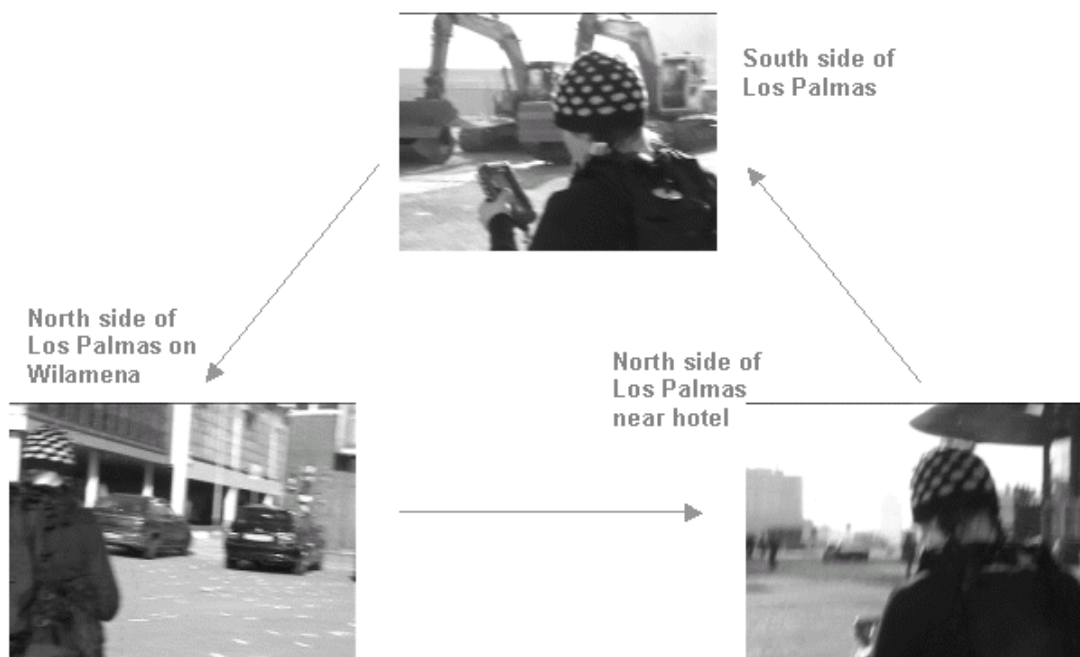

Figure 9. Triangular sweep pattern: a strategy for tracking players down.

The runner suddenly breaks from her sweep pattern and heads off across the road towards the Simulation carpark, coordinating her actions with street traffic as she goes. She makes her way towards the seafront and then stops.

```
Runner 1 on walkie-talkie: Runner 1 in Simulation carpark. Just
waiting for GPS to update my location.
```

Runner one stands waiting for an update. Runner four is nearby and heading towards Los Palmas carpark.

```
Runner 4 on walkie-talkie: This is runner 4 for heading towards Los
Palmas in pursuit of Dave.
```

Runner four reaches the road at the front of Simulation carpark. He stops, looks at the jornada and turns around. He moves around, going back on his tracks in a small semi-circular arc, zooming in and out of the map and correlating the real and virtual through his movements, thereby trying to establish the sense and direction of Dave's movements. He then sets off towards the seafront.

Figure 10. Embodied strategy: moving around in an arc to establish player's direction.

```
Runner 4 on walkie-talkie: This is runner 4 in Simulation carpark,
dancing between cars trying to catch Dave.
```

The runner stops and repeats the arcing movement, then moves forwards towards the seafront again.

```
Runner 4 on walkie-talkie: Runner 4 in the carpark, onto the
cobbles, heading towards the seafront.
```

He stops at the water's edge and repeats the arcing movement.

```
Runner 4 on walkie-talkie: This is runner 4. Lost Dave. GPS down to
4 metres. Connectivity 99%.
```

In other words, runner four's equipment is working well and Dave has eluded him. He examines the jornada, zooming and out, moving around to align the jornada with the real world and plot a course to another player. He then sets off back towards Los Palmas carpark. This does not mean the capture strategy is poor but rather, that slow updates have resulted in elusion. Where this occurs then it is managed simply by plotting a course to another player and resuming the game. Other embodied strategies for locating players were seen in the evening session and are considered below.

```
Runner 1 on walkie-talkie: This is runner 1. I have GPS and 100%
connectivity. I am currently in Los Palmas carpark.
```

She consults the jornada and then turns right up Wilamena in pursuit of a player. Halfway down the street she meets runner three coming the other way. They acknowledge each other, and the player they are both chasing.

Figure 11. Meeting another runner on the same trajectory

The runners consult their jornadas, moving in arcing movements in adjacent positions to one another and thereby moving across the street. Runner three then sets off down the street. Runner one turns around and joins in the chase for the player that has just eluded them both. Runner one stops suddenly and turns around. She walks back up the street, talking inaudibly on the walkie-talkie. She stops at the corner of the street and alleyway, consulting the jornada and talking on the walkie-talkie. A group of spectators stand watching her as she does the capture sequence. Runner one reorients to the game and then heads down Wilamena and turns right towards the seafront, looking at her jornada as she

goes. She walks right up to the seafront and then turns to her left, consulting the jornada again.

```
Runner 1 on walkie-talkie: This runner 1, heading after Justin.
```

Runner one starts running along the seafront when runner two appears on her right, running down the other side of the street.

```
Runner 2: Let's sweep him.
Runner 1: Right.
Runner 2 on walkie-talkie: Runner 1 and 2 sweeping along north side
of the terminal
```


Figure 12. Concerting gameplay: sweeping the streets.

Both runners run along the terminal and stop at adjacent positions, consulting their jornadas. Runner one moves forwards again, walking slowly.

```
Runner 1: I think he's doubled back.
```

Both runners turn around and run back along the terminal. Runner two turns to his right in front of runner one, covering the ground in front of her.

```
Runner 2: Get him. Get him.
```


Figure 13. Concerting gameplay: locating players precisely.

Runner one starts running around in arcing and circular movements to locate the player precisely, then breaks to her left. She then stops and crouches down, removing the digital camera from her pocket.

```
Runner 2: Yes!
Runner 2 on walkie-talkie: Nice going runner 3.
```

Runner one does the capture sequence.

Emergent Features

The sequences of runners' work illuminate the embodied skills or competences involved in embedding the virtual in the real. The work itself might be broadly described as 'navigational work' engaged in and done by runners to locate and capture particular players. The descriptor is a gloss on an assemblage of game-specific *and* street-specific work-practices. Those work-practices include the following.

Projecting an Intercept Course. Players are only present to runners in the virtual representation of the real world and in terms of an avatar's movements. How then are runners – who are situated in the real world - to catch players? The sequences instruct us that runners must *project* a player's presence into the real world if they are to intercept them. 'Project' means that the runners must bring the virtual representation of the real workplace into *alignment with* the real workplace if they are to intercept players. Projection is not some unobservable inner mental event but a grossly observable embodied practice that consists of the bodily movement of the virtual representation to a position where it corresponds for all practical purposes (i.e., not exactly but near enough for the job to-hand) to the real workplace. Projection consists then of the *orientation* of the virtual representation to a position where it reflects real world coordinates, just as an occasioned street map (Psathas 1979),[8] through its situated and bodily alignment with roads, buildings, and other structures represented. This is a street-specific work-practice, tied to ordinary map reading activities and the game relies on this taken for granted competence. The game relies on ordinary map reading competence as this competence provides for the next step in the game: forecasting target coordinates. Again, 'forecasting' is not some unobservable inner mental event but a grossly observable embodied practice that consists, having aligned the virtual workplace with real workplace, of projecting the pathway from point A (the runner's current location) to point B (a player's current location). 'Projecting' this time means *seeing the direction* to a

player, which is given in the bodily orientation of the virtual representation to the real workplace and which, in turn, allows the runner to plot an intercept course to the target location.

Plotting an Intercept Course to the Target Location. Unlike ordinary map reading activities, the runners target location or destination is not static but a movable and indeed moving object: a player. Plotting an intercept course to the target location is a *contingent* action then; contingent on the player's movements. The runners are well aware of this and have adapted street-specific map reading practices to develop game-specific work-practices for managing the contingency. As the runners proceed towards the target location they continuously consult the virtual representation as they go along. 'Consult' means that the runners continuously check on the alignment of the virtual workplace with the real workplace and, at the same time, on their own and players current relation to the topographical features of the real and virtual workplaces, in order to maintain a fix on the target location, much as map users do when way-finding in the streets. In other words, the runners use ordinary map reading competence to *maintain an orientation* to the target location. As the target location is or may be moving, however, 'consulting' also means that the runners continuously check alignment and relative positions in order to *identify changes* in target location (i.e., player movement) and to respond to those changes, *altering trajectory* accordingly. This is an adapted street-specific map reading practice insofar as it evidently exploits ordinary map reading competence yet it is game-specific. It is a *hybrid* practice afforded by the technology and cannot be done with ordinary street maps. It allows runners to narrow the gap between themselves and players, *to track players down to a specific location.*

Tracking Players Down to a Specific Location. The closer runners get to players, the more game-specific the runners work-practices become. As they move closer to the target location, responding to changes as needs be, the runners zoom into and out of the virtual representation of the real workplace. This provides a more fine-grained view of the target location and the action is accompanied by specific bodily movements where the runner looks around the immediate vicinity in which they are situated. 'Zooming in' and 'looking around' are constitutive actions of a game-specific work-practice where the runner tries to track online players down to a specific location or area *within the real workplace*. This involves

the fine-grained alignment of the virtual representation of the real workplace with the real workplace. Runners pause, stop, zoom in, look around them, move the virtual representation to correspond with the real workspace, make small adjustments to their trajectories, turning to their left or right, moving forwards carefully, continuously consulting the virtual representation as the they go, correlating it with the real workplace to establish relative positions. At this point intercept trajectories start to become irrelevant, as the online player is an essentially unseen and unseeable object in the real workplace. The runner cannot simply run over to the player and catch him because the runner is not there to be caught. Furthermore, location and capture is predicated upon modelling techniques and GPS alignment. As GPS coverage varies then so too the gap between the runner and the player varies. Thus, the gap between the runner and player is a variable virtual gap that translates to a specifically variable uncertainty in the real workplace. That uncertainty does not mean that the runner does not know just where the player is; it means that he does not know just where *he* is in relation to the player. While the technology might tell him that he is 10 metres away, 20 metres away, or even 50 metres away, it does not tell him in just which direction: is the player 10 metres nearer to me, away from me, to my left or right? And it's no good consulting the virtual representation to find the relation because it only reflects the virtual gap. How then is the runner to locate the player within a *specifically variable area* in the real workspace then and so transcend the virtual gap to catch the player?

Locating Players within Specifically Variable Areas in the Real Workplace. Runners cannot see just where players are in the real workspace and cannot be sure of their virtual relation to players either. This is not an insurmountable problem, however. Again runners have devised game-specific work-practices to handle the situation and locate and capture players. Having tracked players down to a specifically variable area within the real workplace, the runners know that the players are here somewhere. In order to find out *just where*, the runners have devised and engage in various game-specific *sweep* practices. There are a number of these and they are tied to particular kinds of capture situation. Where several players are 'hanging around' a specific area the runners may move around in a *broad triangular or circular sweep pattern*, hoping to 'bump into' players as they move around the area or otherwise force players to break from their current location from where they may rapidly tracked. Where players make a break for it or are otherwise in transit closely followed by a runner, then the runners frequently slow down and move around in *small*

arcing movements, consulting the virtual representation as they do so. This also allows the runners to 'bump into' players and, failing that, to establish the current direction of and so project the player's movements. Alternatively, runners may collaborate together to locate and capture a player. Sweeping here consists of moving towards a player in adjacent positions to the left and right of a player, thereby *narrowing down the gameplay area* available to the player and employing the arcing pattern to catch the player within the narrowed down area. When collaborating, a runner may also get in front of a player to *block the way*, while the other sweeps the area behind them.

The sequences of runners work elaborate the competences whereby the virtual comes to be embedded in the real. The sequences also instruct us that the competences we have identified above do not stand alone but are intimately connected to other street-specific and game-specific competences. It is evident that 'navigational work' is thoroughly intertwined with the ordinary competences of the street, indeed that it relies for its accomplishment on such competences. We can see, for example, how 'plotting a course' and 'tracking players down' relies not only on ordinary map reading competences but also on ordinary competences of 'crossing the road'. Failing to exercise these competences can be consequential, leading to collisions with street traffic perhaps. It is important then, that the runners coordinate 'navigational work' with the ordinary work of the streets. Other consequential events impact upon navigational work, particularly technological events such as 'slow updates'. Below we consider the impact of the technology on 'navigational work' in order to further elaborate the competences involved in embedding the virtual in the real. We present and consider a number of discrete events in turn, firstly joining runner two in pursuit of a player.

```
Runner 2 on walkie-talkie. Runner 2. I've just lost all players;
I've lost all players!
Runner 2: Looking at jornada. I've got disconnection here.
```

The runner can do no other than abandon the chase, and he informs his colleagues and players alike that he has a specific problem and just where that problem is located.

```
Runner 2 on walkie-talkie: Runner 2. Heading seawards on Otto. I am
currently disconnected.
```

He turns around and starts walking back down the street to the last known point at which he had connectivity. He arrives at the carpark where he last checked the jornada.

```
Runner 2 on walkie-talkie: Runner 2. I've connectivity again. I'm
    in Vern.
```

The runner walks into the carpark consulting the jornada as he goes. He looks at the jornada and up around him at the physical environment as he goes, turning left and moving towards the top of the carpark.

```
Runner 2 on walkie-talkie: Runner 2. I'm in Vern. I can see one
    player on the extreme end of the gameplay area. That player is
    Dave. Runner 2 is closing in on Dave.
```

The runner is walking in between cars, consulting the jornada and looking up at the immediate landscape as he goes along, correlating virtual positions with real world locations as he moves in on Dave.

Figure 14. Correlating virtual positions with real locations.

The runner walks to the top of the carpark consulting the jornada and aligning coordinates as he goes.

```
Runner: Shit!
```

He turns to his left suddenly and starts running along the top of the carpark. Once again he is obliged to coordinate his actions with traffic as he crosses another road and once again he stops to consult the jornada and plot an intercept course to the player he is chasing.

```
Runner on walkie-talkie: Runner 2. I'm in pursuit of Dave.
```

He runs along a side-street, consulting the jornada as he goes, turning left at the end of the street and going down the main street before slowing to a walk.

```
Runner 2 on walkie-talkie: Runner 2. I'm heading seawards  on
    Wilamena, waiting for a server update.
Runner 2 on walkie-talkie: My GPS is currently 35 metres. My server
    position is about 50 metres out.
```

He continues walking down the street, looking at the jornada and his place on the street, visibly seeing the incongruity between his virtual and real positions.

Figure 15. Seeing incongruencies between the virtual and the real.

```
Runner on walkie-talkie: This is runner 2. Can runner 1 and runner
4 hear me, or runner 3 please? Come in.
```

Runner two stops walking and takes the walkie-talkie out of his jacket pocket.

```
Runner 2 on walkie-talkie: This is runner 2. Can anyone hear me
please?
```

Runner two changes channel on the walkie-talkie, moving from the gameplay channel to the technical channel.

Figure 16. Tracking down technical troubles: consulting control staff.

```
Runner 2 on walkie-talkie: This is runner 2 on 4 Zero (technical
channel). I can't get any response from anyone else on 238
```

```
(gameplay channel). Can you please confirm that the other runners
are on 238?
Runner 2 on walkie-talkie: And who else is on 4 Zero please?
Runner 2 on walkie-talkie: And can I confirm that runner 3 is out
and on 238?
Runner 2 on walkie-talkie: Please can someone confirm that runner 3
is running and is on 238 please.
```

The runner puts the walkie-talkie back in his pocket.

```
Runner 2: The two of them (runners 1 and 3) are having technical
trouble.
Runner 2 on walkie-talkie: OK. This is runner 2, I am on Wilamena,
I'm just crossing the road into Kilmas, and I'm in search of a GPS
update.
```

As he attends to the hazards of the street in crossing the road, runner two notices runner three on the other side. He goes over to him.

```
Runner 3: Are you on 238?
Runner 2: I'm on 238, yeah.
Runner 3: OK.
Runner 2: I just switched back 2 minutes ago.
```

Both runners take their walkie-talkies out of their jacket pockets and check the channel they are set on. They then replace the walkie-talkies.

Figure 17. Tracking down troubles: consulting other runners.

```
Runner 2: Looking at runner 3's jornada, whose case is open. What's
the problem?
Runner 3: Just not moving.
```

```
Runner 2: Yeah, I'm having the same. Looks like we have a bit of a
server sort of screw up. I haven't had a position update in about 2
or 3 minutes now.
Runner 3: All right.
```
Runner 2 starts walking away from runner 3.
```
Runner 2 on walkie-talkie: This is runner 2. I've had no GPS update
in 2 or 3 minutes.
```
The runner carries on walking towards the seafront, where he knows there is usually good GPS coverage.

Emergent Features

The instance shows us not only what sort of technical troubles impact upon gameplay – in this case 'disconnection' and 'GPS error' – and how such troubles impact upon gameplay - causing runners to abandon the chase – but also, and importantly, it instructs us as to the competences involved in *handling technical troubles* on the streets. We can see, for example, how in experiencing 'disconnection' and 'GPS error' the runner makes the technical trouble he is experiencing public knowledge. Encountering a trouble is announced to the other runners over the walkie-talkie, making others *aware* of the *nature of the technical trouble* and the *location* at which the trouble occurs. The runner handles 'disconnection' by retracing his steps, thereby moving to a location where he last had connectivity. This strategy trades on and exploits both *working knowledge* of the technology (of knowing that disconnections are transient technical phenomena that may be resolved by moving to a better location) and *local knowledge* of the environment in which the technology is situated (of knowing where in the environment is a 'better location' to move to). Furthermore, the instance instructs us how such forms of knowledge are developed: through hands on experience of using the technology *in situ* and through making others aware of and thus *sharing* the problems encountered as they occur. Through sharing troubles runners combine working knowledge of the technology and local knowledge of the environment to form a *common stock of knowledge* of the gameplay environment, which may be exploited to handle technical troubles on the streets. That common stock of knowledge is not a starting point for gameplay, however, but an emergent collaborative feature of gameplay, just as the identification and subsequent resolution of technical troubles may be.

The instance instructs us that an important feature of runners work is *diagnosing technical troubles*. While the nature of a problem might be readily apparent – a 'disconnection' or

plainly visible incongruity between the virtual and the real brought about through 'GPS error' – the source or the extent of troubles is not always clear (e.g. is 'GPS error' a result of poor satellite availability or some other technical matter, and are others experiencing such troubles too?). In order to diagnose and resolve troubles runners are obliged to *collaborate*, both indirectly via the walkie-talkies and directly with other runners they encounter on the streets. The instance instructs that on experiencing incongruities runners may turn to one another via the walkie-talkies to see if similar troubles are being encountered by them. Where this strategy fails runners may then collaborate with control room staff to *establish the gameplay status of the other runners*; i.e. to establish whether or not other runners are in the game and, should responses not be forthcoming from other runners, what channel they are on. Direct collaboration with other runners is serendipitous in nature though nonetheless important for that, allowing runners to not only to see for themselves the problems others are having but also, and reflexively, to establish the *generality of the troubles* they are encountering. Thus, direct collaboration allows runners to determine whether or not the problems they are encountering are there's alone, and possibly related to their *personal kit*, or others as well and related to *the game's technical infrastructure*. This, in turn, suggests the next move in handling the problem to-hand, moving off to a 'better location' in the latter case, for example. Whatever the particular problem, it is clear that the handling of technical troubles relies on a common stock of knowledge and is embedded in specific constellations of indirect and direct collaboration that provide for the diagnosis and resolution of technical troubles. The following instance further elaborates the competences and arrangements of collaboration involved in handling technical troubles. We join runner one in Los Palmas carpark.

Runner 1 is walking around the Los Palmas carpark looking at her jornada. She walks to the southern edge of the carpark and then turns around and walks north, crossing the road on Wilamena, going towards the seafront.

```
Runner 1 on walkie-talkie: Runner 1. Just heading into Simulation
carpark.
```

She attends closely to the jornada as she walks across the carpark, turns to her right and stops suddenly, holding the jornada up in front of her.

```
Runner 2 on walkie-talkie: Runner 2. I've got locations on players
but I seem to be stuck in New York.
```

Figure 18. Recognising a trouble to-hand: seeing incongruity between the virtual and the real.

Runner one turns around and starts to walk back towards Los Palmas carpark. She stops at the roadside, looking closely at the jornada.

Figure 19. Encountering location troubles.

Runner one turns around again and walks back towards the seafront. She takes the walkie-talkie out of her jacket pocket and switches to the technical channel.

```
Runner 2 on walkie-talkie: This is runner 2 – oh, it doesn't
matter.
```

Runner 2: I got stuck in one place. It said I was right over there (points to Los Palmas), when I was over here, but it's updated me know. It's really bizarre, sometimes you seem to get stuck in one place. But that was an excessively long time. A bit weird.

Figure 20. Handling location troubles: moving from place to place.

Runner one then heads back towards the road. She turns left and walks up Wilamena, crosses the road, turns down the first alley she comes to on her right and then turns right again at the end of that, heading towards Los Palmas. Halfway down the street she comes across one of the team's technical staff.

Runner 1: John, my positions gone really bizarre as in its not saying where I am.

John looks at the jornada interface.

Figure 21. Encountering 'bizarre' troubles: consulting a technical expert.

```
Runner 1: And I know that it takes a while but I seem to be getting
stuck in really bizarre places. Like, I am not in Simulation
carpark at the moment.
John: No. The best thing to do is to stand out in the middle of the
carpark and just do a reset.
Runner 1: Do a reset.
John: I think so. Looks at jornada. Yeah, its not there at all is
it.
Runner 1: No.
John: Do you want to go into the carpark and see if we can restart
it?
Runner 2: Yeah.
```

John and the runner walk to middle of the Los Palmas carpark. Runner one sets her walkie-talkie to the technical channel again.

```
Runner 1 on walkie-talkie: This is runner 1 to Martin. This is
runner 1. We're now in Los Palmas carpark. We're just going to do a
full restart because there we seem to be stuck somewhere else.
```

John takes the jornada out of its case and resets the jornada. He waits while the jornada restarts then plugs it into the network.

Figure 22. Resolving 'bizarre' troubles: restarting runner's kit.

```
Runner 1: Thanks for that.
John: Looking at jornada. OK.
Runner 1: Brilliant, are we're in the right place?
John: We've not got GPS yet. But, I think there's only about 3
satellites or something.
Runner 1: Yeah.
Runner 1: I think runner 4's just dropped out of GPS.
Runner 1: God, there's so many players. Oh come on, I'm so close to
quite a lot of them.
John: Does it show where runner 3 is? Looks at jornada. Someone's
there. Points to place on jornada.
```

```
Runner 1: That's runner 4.
```

They look up from the jornada and see runner 4 across the road.

```
Runner 1: Come on mister satellite.
Runner 1 on walkie-talkie: This is runner 2. We've done a reset.
We're just waiting for GPS.
John: Looking across road. Runner 4 seems to be waiting.
Runner 1: Looking at jornada. Yeah he is. He's just disappeared off
here.
```
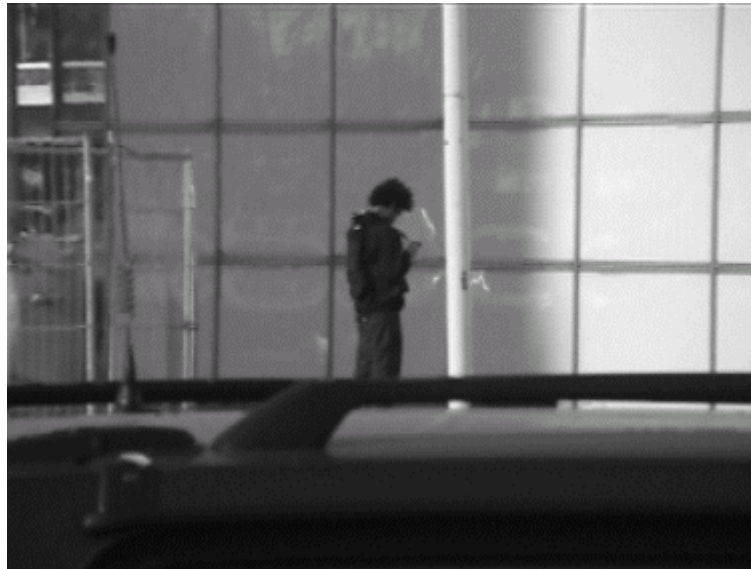

Figure 23. Seeing that other have the same problem.

```
Runner 1: I should go onto the other channel. Switches walkie-
talkie back to gameplay channel.
Runner 1 on walkie-talkie: Runner 1. Runner 4 can you here me?
Runner 1 on walkie-talkie: This is runner 1. Currently in Los
Palmas carpark waiting for GPS.
John: Are any runners running?
Runner 1: No.
John: Everybody's down?
Runner 1: I think so.
Runner 1 on walkie-talkie: Runner 2 what is your current situation?
Runner 1 on walkie-talkie: Runner 2 do you have GPS and
connectivity at the moment?
Runner 1: He's got GPS.
Runner 1 on walkie-talkie: Runner 2 there are currently a lot of
players in Los Palmas carpark.
Runner 1: Hup, I've got GPS.
```

Emergent Features

Again the instance shows us not only what sort of technical troubles impact upon gameplay – in this case 'getting stuck', where the technology fails to reflect real world coordinates – and how such troubles impact upon gameplay - causing runners to abandon the chase – but also instructs us as to the competences involved in handling technical troubles on the streets. We can see, for example, how the runner tries to resolve 'getting stuck' by moving around from place to place in the hope that the problem is a result of a slow update. That this is not the case is suggested by the unusually long time it takes for the update to occur and by the reoccurrence of the problem shortly afterwards. Serendipity again provides for *direct collaboration* as the runner meets a member of control staff who is out on the street. The control staff brings technical competence to bear on the problem, which is plainly visible in the incongruence between the real and the virtual. The control staff exploits local knowledge of the gameplay environment and takes the runner into the middle of a carpark which he knows to be a good location for connectivity and restarts the runners kit. Restarting the kit is a matter of *rigor*, requiring that a number of discrete steps comprising a 'start-up sequence' are closely followed. It is observable too that 'doing a restart' involves *indirect collaboration* with other control room staff, who are notified of the runners location (e.g. in Los Palmas carpark), what technical task is to-hand is (e.g. doing a restart) and why (e.g. because I'm stuck somewhere else). Working knowledge of the technological infrastructure was drawn upon to account for slow GPS update as the runner waited to rejoin the game, which exploited an awareness of satellite availability. It is notable that runners routinely consulted control room staff as to satellite availability during gameplay when encountering technical troubles as a low number of satellites often accounted for those troubles. The instance also makes it visible, as in the previous instance, that runners consult one another when encountering troubles, collaborating indirectly via the walkie-talkies to establish one another's gameplay status and also 'surreptitiously monitoring'[9] the streets to see what other runners are doing and so establishing whether or not problems are local (i.e. of this kit) or general (of the technological infrastructure).

Summary

The instances provided above instruct us as to the main technical troubles that runners encounter in the course of their work. In addition to 'jumping past' players as a result of slow updates, as shown in our initial discussion of runners' work, or even 'jumping on' to players from unreasonable distances, runners are routinely confronted by,

- *Disconnections* where the visibility of players is lost.
- *GPS errors* which produce major incongruencies between the real and the virtual.
- *Getting stuck* where the technology grossly fails to reflect or respond to the real world coordinates of the runner.

These technical troubles are handled by exploiting a *common stock of knowledge* built up over the unfolding course of playing the game, which consists of working knowledge of the technology and local knowledge of the environment in which gameplay is situated. Runners draw on this stock of knowledge to resolve technical troubles, moving to good connectivity locations in the case of disconnections, for example, and otherwise to *diagnose* and then resolve technical troubles. Diagnosis is essentially rooted in various arrangements of *collaboration* and *awareness* including,

- *Indirect collaboration between runners* via walkie-talkies, which are concerned to appraise runners of current troubles and the locations at which they occur, and to establish the gameplay status of other runners and so determine whether troubles are local or general.
- *Indirect collaboration between runners and control room staff* via walkie-talkies, both to establish the gameplay status of other runners and to notify the control room of current troubles, the locations at which they occur, and any remedial actions.
- *Surreptitious monitoring of* and *direct collaboration between runners*, which are concerned to determine whether troubles are local or general.
- *Direct collaboration between runners and control room staff*, which are concerned to resolve persistent technical troubles.

Clearly there is only so much that runners can do to resolve technical troubles. Technical competences are essential to playing the game and below we turn our attention to the work of control room staff to explicate the embodied competences and arrangements of collaboration at work in the control room. We join the control room staff at the 'pre-show test', where the technology is made ready for playing the game.

Runners one, two and four are on the streets and have started their jornadas. They are tuned into the technical channel on their walkie-talkies so that they can talk to the controller. The controller is looking at the management overview, which shows when and that the runners are 'up and running' – i.e., that they are connected to the network and have GPS.
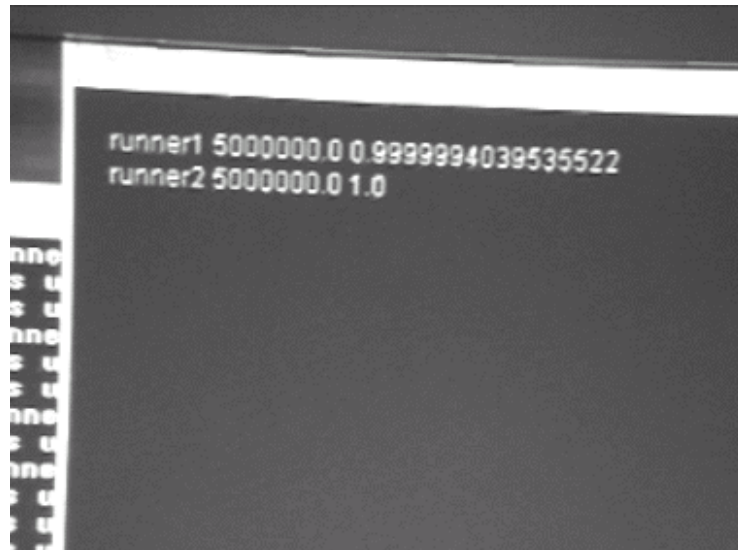
```
Controller: Where is runner 4?
```


Figure 24. Runner 4 is conspicuously absent.

The networker is looking at the network monitor, which shows that and when runners are connected to the network

```
Networker: He's on the network, but his connection is bad.
```
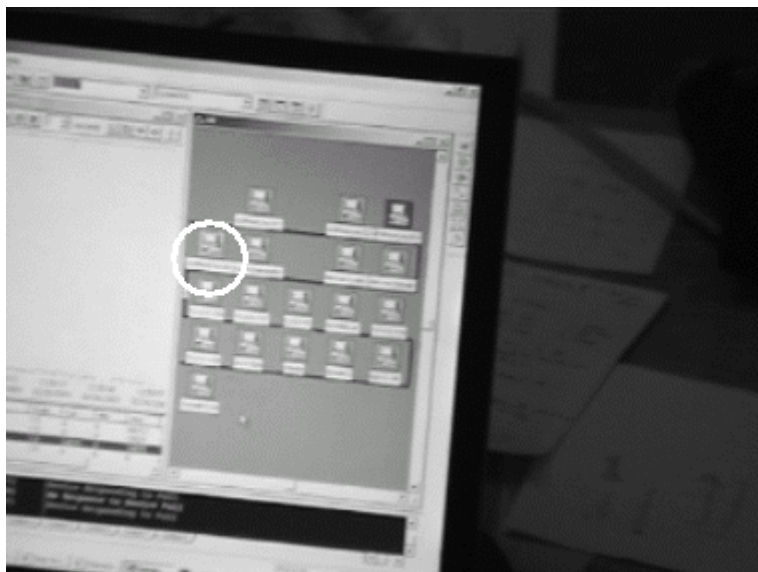

Figure 25. Runner 4's icon flashing yellow indicates a bad connection.

```
Runner 4 on walkie-talkie: Runner 4 waiting for GPS update.
Controller on walkie-talkie: Runner 4, please disconnect and reset
- you've connected badly.
Networker: Looking at network monitor. He's disconnected.
```
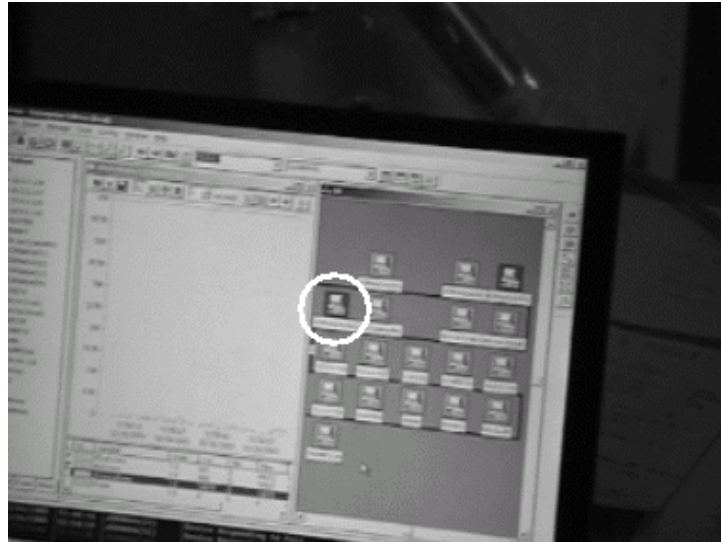

Figure 26. Runner 4's icon goes red indicating disconnection.

```
Networker: Looking at network monitor. No sign of runner 4 yet.
Runner 4 on walkie-talkie: This is runner 4 standing by.
Controller on walkie-talkie: Please carry on standing by runner 4.
```

The controller is looking at the gameserver interface, examining the status of the data spaces.

```
Controller: No, I'm going to have to restart the two data spaces,
they've fallen over for some reason
```
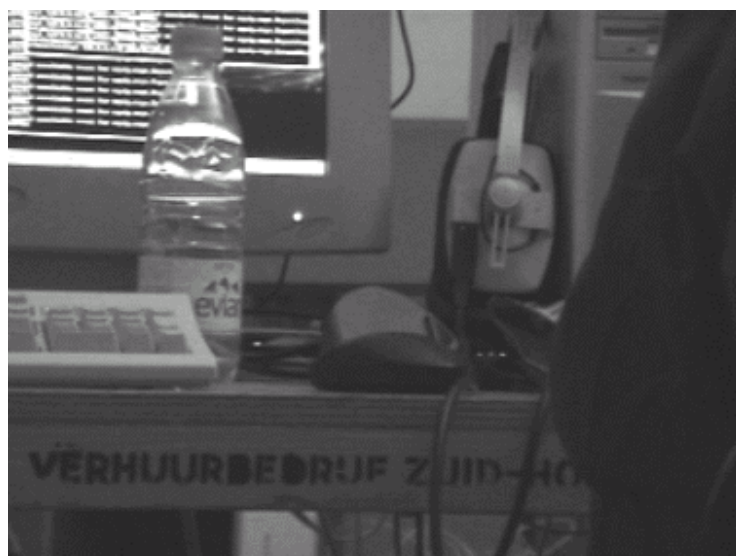

Figure 27. Consulting the gameserver.

```
Controller to Networker: Where's John?
Networker: John's gone upstairs.
Controller on walkie-talkie: John, can you come down here. I need
to restart the data spaces.
```

John confirms on walkie-talkie.

```
Controller on walkie-talkie: OK, so runners don't do anything. I'll
let you know if you need to do a restart.
Controller on walkie-talkie: Runner 1 and runner 2 starting
successfully. Don't do anything.
```

John walks into the control room.

```
Controller to John: John, John. I had to restart the data spaces.
John: OK. Sorry, you've had to or you are?
Controller: Yes, I have.
```

The controller and John are working at separate machines to get the game up and running
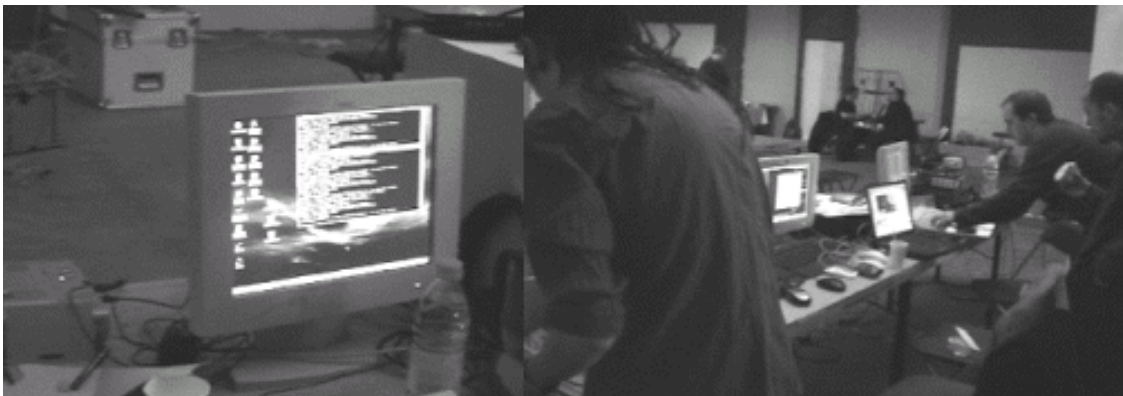again.

Figure 28. Restarting the data spaces, gameserver, audio, and the rest.

```
Controller on walkie-talkie: Runner 4, could you turn your iPAQ on
and put your network card in but do not run the interface.
Runner 4 on walkie-talkie: Can you repeat that.
Controller on walkie-talkie: Certainly. Can you please turn on your
jornada and insert the network card but do not run the interface
yet.
Runner 4 on walkie-talkie: Runner 4, I understand.
```

The controller is monitoring gameserver interface and management overview, looking for
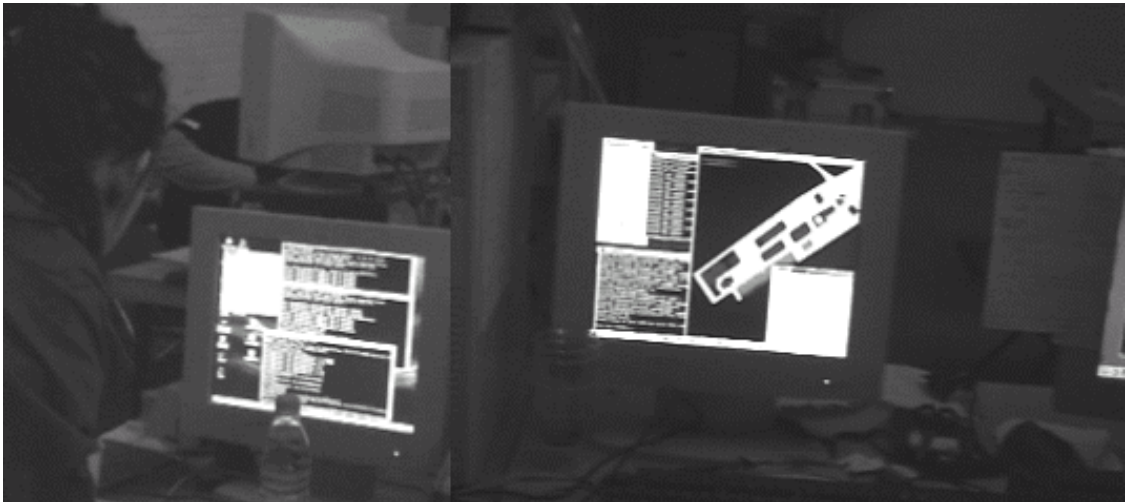runner four.

Figure 29. Searching for runner 4.

Runner four is not visible on either interface so the controller walks over to the network interface and checks that.

Figure 30. Still searching for runner 4.

Runner four's icon on the network monitor is red, he is still disconnected.

```
Controller on walkie-talkie: Runner 4, confirm that you have
started your jornada but not the interface.
Runner 4 on walkie-talkie: Runner 4, the jornada is running.
Networker: Maybe he's in a bad location for connectivity.
Controller on walkie-talkie: Runner 4, what is your location?
Runner 4 on walkie-talkie: I'm located on the corner of [X] and
[Y].
```

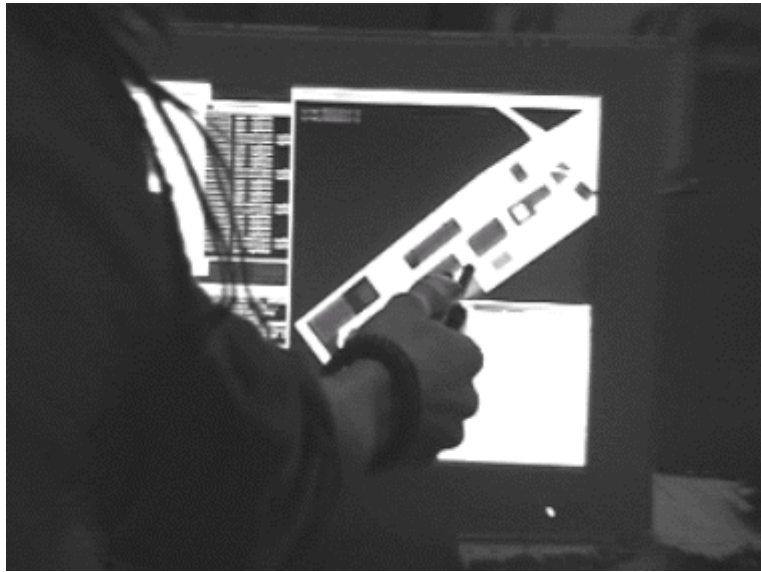Controller. *Points to management overview.* That's there.

Figure 31. Locating runner 4.

John: I'll go down.

Controller on walkie-talkie: Runner 4, please stay where you are, John's coming down.

Runner 4 on walkie-talkie: Runner 4, I'm looking forward to that.

John on runner 4's walkie-talkie: Can you confirm runner 4's connectivity.

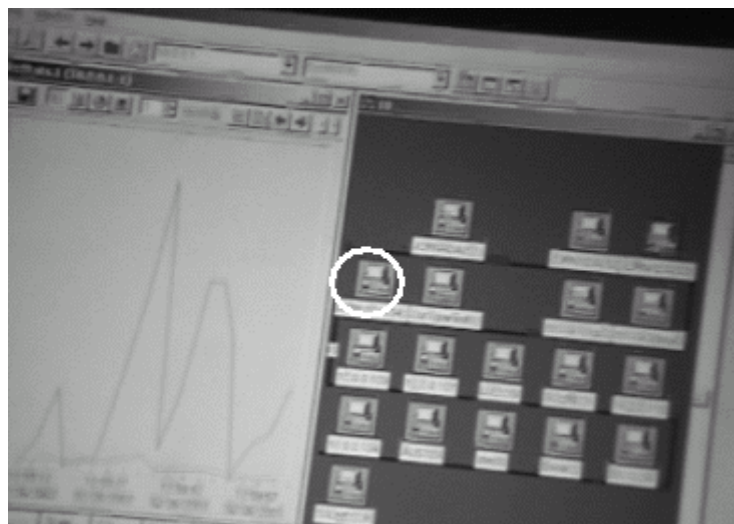Networker: *Looks at network monitor.* Runner 4 is connected.

Figure 32. Confirming runner 4's connectivity: icon has gone green.

Controller on walkie-talkie: OK, we've got that. Can you run the client now runner 4.

```
Runner 4 on walkie-talkie: Runner 4, client is connected.
Controller on walkie-talkie: Runner 4, we have the connection and
you're getting GPS.
```
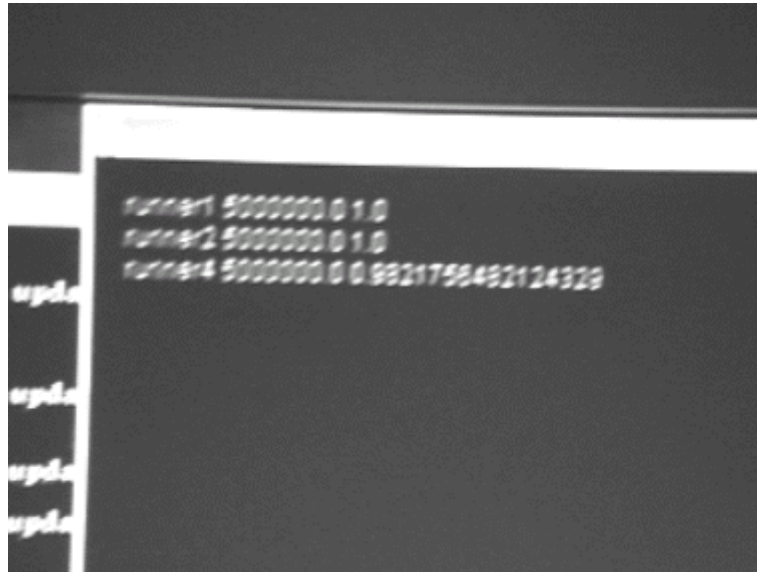

Figure 33. All runners connected and receiving GPS: game on.

```
Runner 4 on walkie-talkie: Runner 4, confirm that – GPS down to 5
metres, connectivity 98%.
Controller to Networker: Yep. So we now have 3 runners online all
reporting GPS.
Networker: Down to 2 to 3 metres, which is nice.
```

Emergent Features

The 'pre-show test' is a stable feature of the game's production, engaged in before each session to get the runners kit 'up and running' and to prepare for the start of the game. The interfaces in the control room are embedded in the collaborative work of getting the runners' kit up and running. The instance instructs us that *that* work is concerned not only to establish the smooth running of the gameplay environment and runners equipment but also, and importantly, to identify contingent problems that occur in and that environment and with that equipment through the collaborative use of those interfaces as *analytic devices* to diagnose and resolve emergent troubles. The instance instructs us, then, as to the artful ways in which control room staff employ the game's control interfaces to reason about the proper working of the gameplay environment and emergent troubles and so come to embed the virtual in their workspace to meet the demands of their work. When initiating the pre-show test the controller watches the *management interface* for the runner's equipment

to register their *virtual presence*, which consists of a name and a series of digits indicating connectivity strength and GPS accuracy. That same interface enables the controller to see connectivity problems effecting the smooth running of the game by the *absence* of runner's virtual presence. While the management overview indicates that there is a problem via a runner's absence it does not show what the problem is, however. The problem has to be worked out. Accordingly, the problem is announced to other control room staff, specifically the networker, who examines the *network interface* for the *virtual presence* of the problematic runner. The network monitor provides three basic indications: green for connected, yellow for connected but unstable, and red for disconnected. In response to the controller's announcement, the networker examines the network monitor and *relays* the information indicating the problematic *runner's status* back to the controller: it's yellow, he has a bad connection. This *suggests* that there is *something wrong* with the runner's equipment. Via the walkie-talkie the controller asks the runner to confirm the status of his equipment - he is waiting for GPS – and instructs the runner to restart the equipment, which he does. The networker *monitors the restart* via the network interface, *relaying* status to the controller. That the runner has not rapidly reconnected as the controller might normally expect is cause for concern and he *consults the gameserver* to see if the runner has a *presence* there. On consulting the gameserver interface it is apparent that the data spaces have 'fallen down' for some unknown reason. The problem has not yet been identified and the game has to be restarted, which requires further collaboration between control room staff, as the components of the game are located on several machines. As the game is restarted the controller issues instructions as to how to proceed to the runners and consults the *management overview* to *see their virtual presence*. Visibly, runners one and two have started successfully. He then issues instructions to runner four, guiding him through and so coordinating the start up sequence. In doing this the controller knows that the start up sequence is critical and assumes that the runner may previously have executed it wrongly causing the data spaces to 'fall down'. Again, he consults the management overview looking for the runner's virtual presence. He has *no presence* and the controller goes in search of it, consulting the *network monitor* directly. Again the runner is *not present* and the controller contacts the runner via the walkie-talkie to confirm that the runner has followed his instructions regarding the start up sequence. The controller's query is confirmed by the runner, which suggests that he may in a poor location for connectivity and this, in turn, may be the cause of the problem. The control room staff identify his location by asking his

coordinates and *pointing them out* for one another on the *management overview*. A member of staff then goes out to the runner to 1) check the start up sequence has been done properly and 2) to check to see if the runner is in a poor connectivity location. The staff member does the start up sequence as instructed by the controller and asks the controller to confirm status: the *network monitor* indicates that he is *on the network* and may now proceed to complete the sequence. On completion the runner's *virtual presence* is indicated on the *management overview*. All runners have a virtual presence and their kit is 'up and running'. The game may begin.

```
Controller on walkie-talkie: We have three minutes go until game
time and there three people in the queue.
```
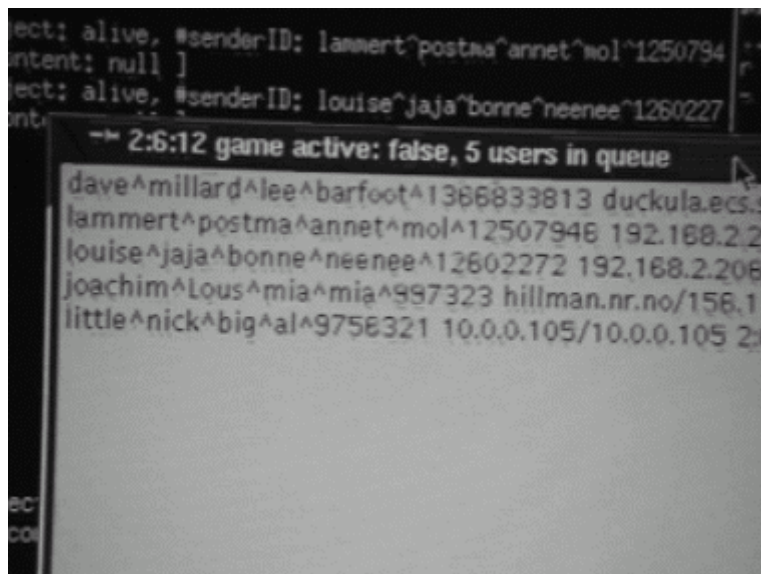

Figure 34. Preparing to start the game: checking the game queue and relaying details.

```
Controller on walkie-talkie: We have two minutes go until game time
and there five people in the queue.
Runner 4 on walkie-talkie: Runner 4 to runner 1 and runner 2,
switching to game channel.
John to controller: Don't start before they've switched to the game
channel. Wait.
Runner 4 on walkie-talkie: Runner 4 to runner 1 and runner 2,
switching to game channel.
Runner 1 on walkie-talkie: The time is 3.58 now, 3.58 now. Can
please confirm Runner 4.
Runner 4 on walkie-talkie: This is runner 4, 3.58 now. See you
there.
```

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```
Controller on walkie-talkie: All runners, it's 2 o'clock, there are
9 people in the queue and I'm activating the game.
```

The controller activates the game queue, which puts players into the data space, as can be seen on the overview map.
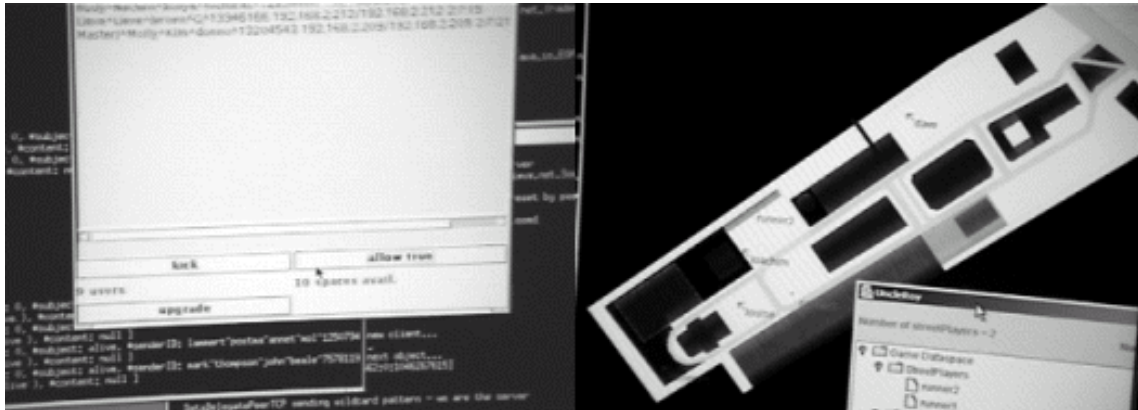

Figure 35. Letting players into and seeing players in the data space.

Emergent Features

The instance instructs us that there is collaboratively organized start sequence to the game, which mediates between pre-show test and the game proper. With the runner's equipment up and running, the controller notifies the runners via walkie-talkie the time to go until the game commences and how many players are waiting to engage. This information, drawn from the game queue interface located on the management overview, signals the runners to switch their walkie-talkies to the gameplay channel. The information is also updated as time is counted down and the game is activated. Activating the game consists of activating the game queue to drop players into the gameplay server. That this happens is confirmed by the controller consulting the map of the gameplay area in the management overview and seeing virtual representations of players begin to populate the virtual workplace. With the sequence accomplished, gameplay can begin. We have already seen what that work consists of for runners. The following instances show what that work consists of for control room staff.

```
Controller: Looking at management overview. Runner 4's down again.
Networker: Looks at network monitor. Yep, runner 4's down.
Networker: 4's back.
```

The controller is looking at the gameserver and management overview.

```
Controller on walkie-talkie: Runner 4, you have no connection.
What's your status?
```
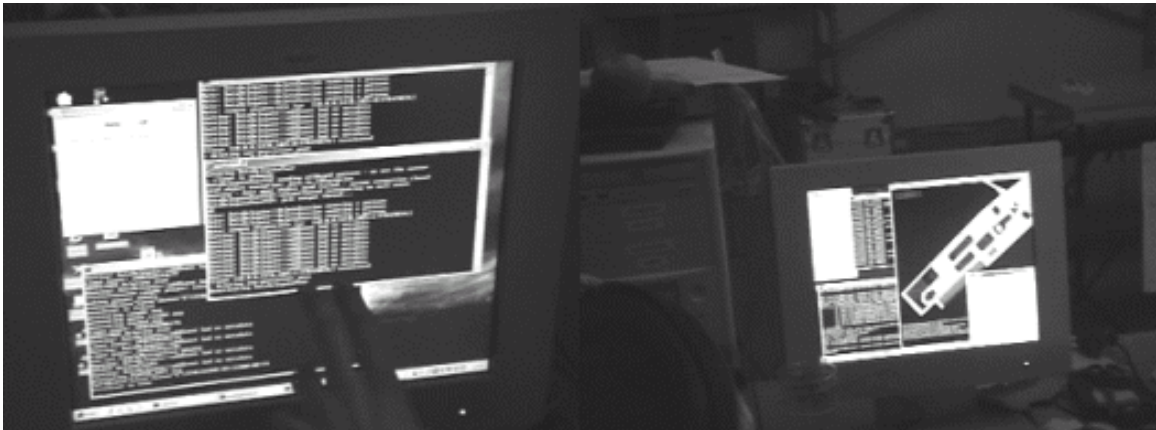
Figure 36. Seeing 'no connection'.

Networker comes over to controller's station and looks at gameserver and management overview. The network monitor shows that runner 4 is connected.
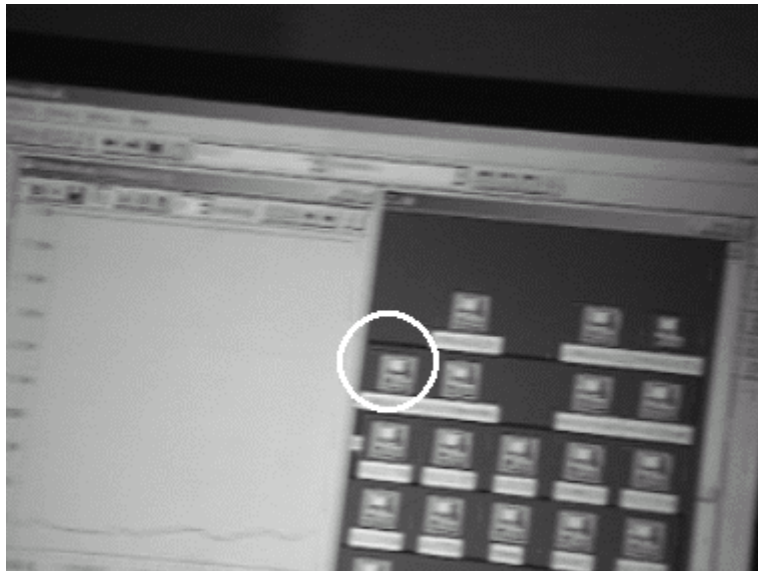
Figure 37. Different views on connectivity: runner 4 icon is green.

```
Controller: You see.
Networker: Yeah.

Controller on walkie-talkie: Runner 4, please go to the technical
channel.
Controller on walkie-talkie: Runner 4, runner 4, please go to the
technical channel.
Controller: What's he doing?
Runner on walkie-talkie: This is runner 4, are you receiving?
Controller on walkie-talkie: Runner 4, what is your status? We have
a connection but no GPS or game connection.
```

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```
Runner 4 on walkie-talkie: [inaudible]
John: What?
Controller: He has no connectivity at all.
John: Where abouts is he?
Controller: Points to location on overview map. He's here.
```


Figure 38. Establishing a mutual sense of runner 4's location.

```
Controller on walkie-talkie: Runner 4, I suggest you do a restart.
Do a full restart to regain your connection.
```
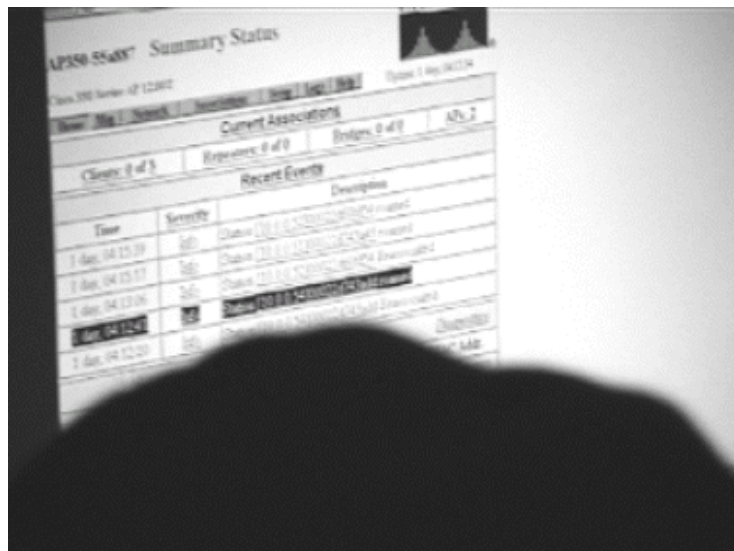
John checks waveLAN status out.

Figure 39. No connection? What's the waveLAN status?

```
Controller on walkie-talkie: Can you confirm Runner 4, do a full
restart.
Networker: Looking at network monitor. 2's down, 2's down.
```

```
Runner 4 on walkie-talkie: Runner 4, confirm full restart.
Controller on walkie-talkie: Got that runner 4.
John: Looking at waveLAN monitor. Baystation's working fine.
```

John leaves the control room to find runner 4, taking a walkie-talkie with him.

```
Controller on walkie-talkie: Runner 4 turn off your device
immediately, turn off your device.
Controller on walkie-talkie: Runner 4, turn off your device.
Controller on walkie-talkie: Runners 1 and 2, be aware that runner
4's bad connection is causing problems up here.
Controller on walkie-talkie: Runner 4's killed the data space
again.
John on walkie-talkie: Are you sure it was runner 4 and not one of
the online clients?
Controller on walkie-talkie: Yes, definitely.
John on walkie-talkie: OK.
Controller on walkie-talkie: The online clients are still active.
```

The controller is looking at the gameserver and management overview.

```
Controller: OK, I'm going for a full restart, again.
Runner on walkie-talkie: OK.
Controller on walkie-talkie: Runners please be aware that I'm going
for a full restart again after runner 4's bad connection.
Controller on walkie-talkie: John, the data space, er, the
database. How do you start the database?
John on walkie-talkie: Do not start the database. Do not start the
database. Leave it as it is. It will be fine.
Controller on walkie-talkie: OK, got that.
John on walkie-talkie: Just restart the audio stream.
```

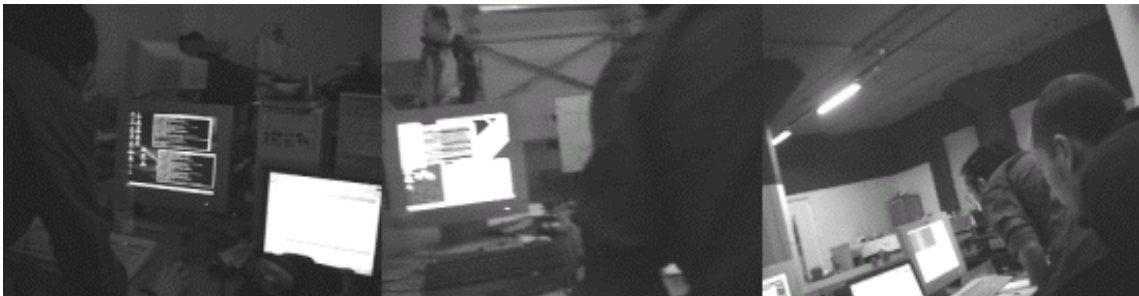The controller restarts the gameserver and other components.

Figure 40. Managing terminal difficulties - restarting the game.

```
John on walkie-talkie: John to control room.
Controller on walkie-talkie: OK, what's the status of runner 4?
John on walkie-talkie: Can you pass on a message to all runners not
to use Edam at all.
Controller on walkie-talkie: Not to use where, Edam (a street in
the runners' place)?
John on walkie-talkie: Do not go down Edam.
Controller on walkie-talkie: OK, why?
John on walkie-talkie: Because we have low coverage and that's
what's screwed runner 4's jornada up.
Controller on walkie-talkie: OK. Runners 1 and 2, do not use Edam,
there is a problem with waveLAN connectivity. Do not use Edam.
```

Having restarted the game, the controller sets about activating the game again, letting players into the game from the queue.
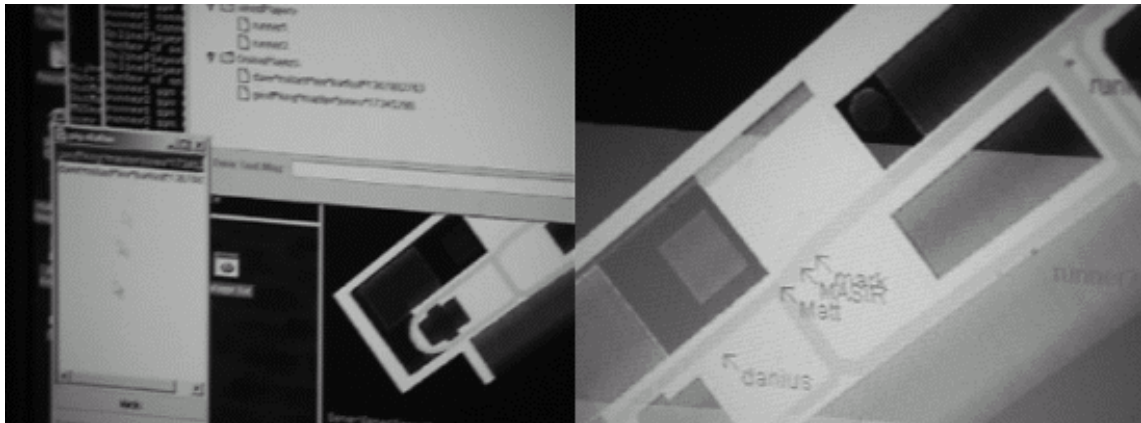
Figure 41. Getting players back into the game and seeing them there.

At the same time, the networker is examining his monitor, which shows all runners disconnected. He runs an online check on the monitor and then picks up a technical diagram off his desk. He consults the diagram, moves around to the rear of the workspace and starts to check cable around the control room. He then returns to his place and checks the network monitor again.

Figure 42. Diagnosing connectivity problems: checking wiring.

```
Networker: The Cisco [inaudible] went down for some reason. It
looks like it unpowered. It's powering up again now.
Controller: Is runner 4 online?
Networker: Runners 1 and 2 are, 4's out.
Networker: Runner 4 is back.
Controller: That was all a bit mad. There was a bad connection from
runner 4. Basically, if you start up wrongly it fucks it up – the
start up sequence, that's the weakest point. If I restart that, I
have to restart everything else. But it was only like, what, 2 or 3
minutes.
```

Emergent Features

The instance instructs that control room work is concerned with *monitoring* gameplay and *'fire-fighting'* as and when technical troubles occur. The instance sheds particular light on the analytic work involved in handling disconnections. Disconnections are manifest by the absence of a runner's virtual presence. What is interesting here are the *multiplicity of different views on connectivity*, and so different ways in which a runner has a virtual presence, and *how those views* are drawn upon to identify, analyse and resolve disconnection problems. The instance instructs us that a runner has a virtual presence in the management overview, network monitor and game server. In this instance, the controller *sees the absence* of runner four in the *management overview* and *game server* and asks the networker to confirm the runner's status. The networker consults the *network monitor* and reports that the runner is *connected*. Clearly there is a problem to-hand, as is confirmed by the networker and controller's collaborative consultation of the management overview and gameserver. The controller contacts the runner to establish his status according to *his equipment*, who reports

that he is disconnected. The other member of the control staff, who is responsible for managing the waveLAN, asks *where the runner is located* and the controller points the runner's location out on the *management overview*. The controller instructs the runner to restart his equipment and the other member of the control staff checks out the *status of the waveLAN*, confirming shortly afterwards that the baystation in that area seems to be OK. Meanwhile, the networker reports that the *problem is amplifying*, as can be seen by the *loss of another runner* from the *network monitor*. The other member of the control staff leaves the control room to find runner four who, for unknown reasons, seems to be causing the problem. The controller instructs runner four to turn off his equipment immediately in a bid to prevent further problems, but it is too late: the *gameserver* indicates that the dataspace has been 'killed' again. The controller then notifies the runners that he is going to do a full restart. As the other member of the control staff is out on the streets, the controller has to execute the restart himself. He does not know the whole restart procedure – competences are distributed amongst the control staff, just as the control interfaces for their work are – and he contacts the member via the walkie-talkie to establish the correct procedure. As the game is restarted the other member of the control room staff notifies the controller to instruct the runners not to use a particular area of the real workspace as there is a problem with waveLAN connectivity at that location causing a 'black spot'. The controller forwards the information to the runners and then repopulates the virtual workplace with players, checking that players are being put back into the game by consulting the *management overview*. At the same time, the networker notices a problem with the network and resorts to consulting *wiring diagrams* and *checking physical connections* to resolve the trouble. As a result of these actions the players and runners are back online. The problem has been resolved – being a consequence of poor waveLAN connectivity and a failure to execute the start up sequence correctly. We join the game again as play is resumed to further elaborate artful ways in game control interfaces are drawn upon to identify, analyse and resolve further troubles.

```
Controller: Looking at management overview. Why's nobody talking
(sending text messages)?
Controller: OK, the people who died earlier can't see anyone on the
map.
John: What, the online players?
Controller: Yep.
```

```
John: They've stayed connected?
```
The controller types a text message into the game giving the instruction 'if you see NO other players please reconnect'.
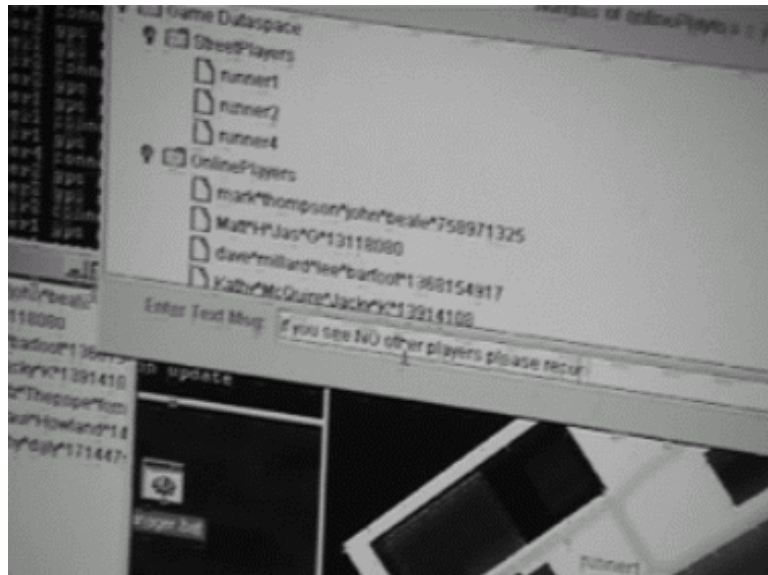
Figure 43. Notifying players of technical troubles.

The message is sent several times in rapid succession to provide for its visibility as a block of repetitive text furnishing a clear instruction. The controller then logs into the game himself to make sure that everything is working properly. There is a problem with his machine.
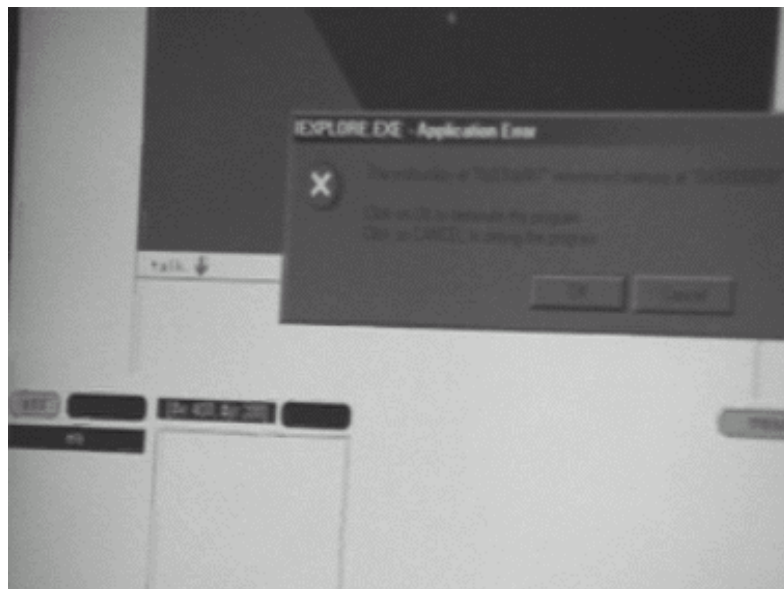
Figure 44. Trying to log on – application error!

Runner four comes into the control room to changeover.

```
Controller to Game Interface Designer: Dave, every time I look at
the map I get that. Points to application error sign. I'm trying to
see if I can see other players because they're not talking to each
another.
```

Dave, who is also one of the runners and in the middle of a changeover, shrugs his shoulders in bemusement.

```
Controller: John, is that laptop working?
```

John is downloading photos from runner 4's camera. He nods in response to the controller.
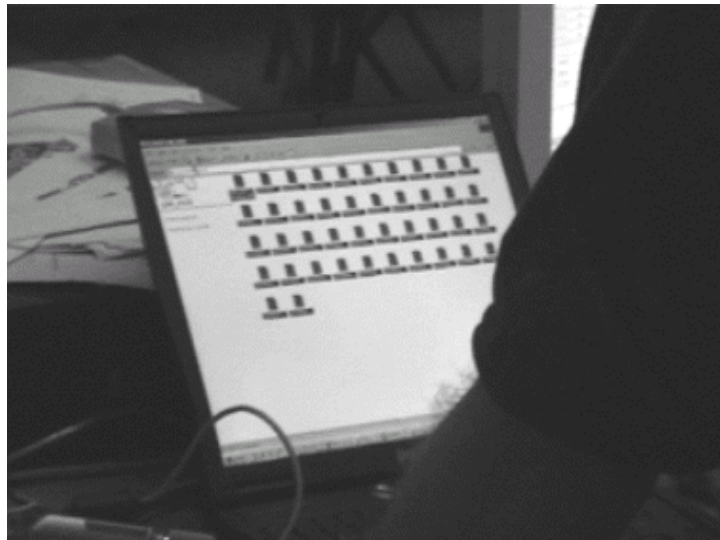
Figure 45. Downloading capture photos for the archive.

```
Controller: Will you join the game?
```

John joins the gameplay queue and sends a message as soon as he gets in.

Figure 46. Testing texting.

```
John: There you go, that got through.
```

```
Controller: Looking at management overview. Yeah. Points to
management overview. But it's not going back out.
```


Figure 47. The visible absence of just sent text.

```
John: Oh, I see. We'll have to reboot.
Controller: Again!
Controller on walkie-talkie: Runners, I am restarting the game now.
```

Emergent Features

The instance instructs us to the *multiplicity of different interfaces* implicated in identifying, analysing and resolving problems. That the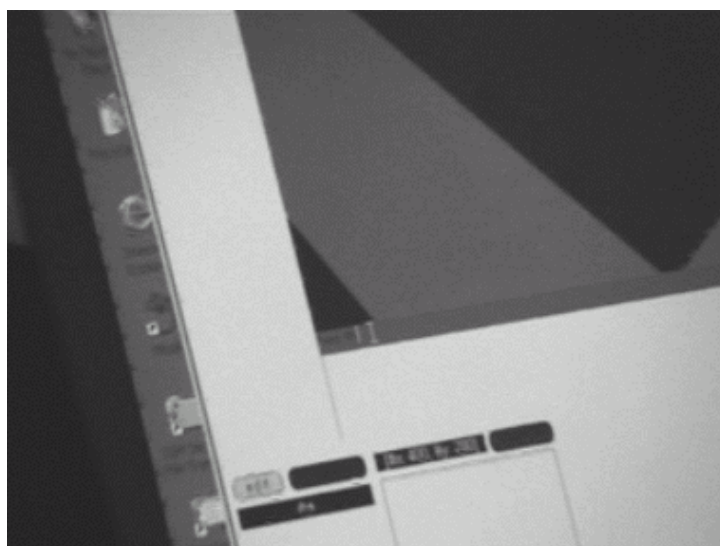re is a problem in this case becomes apparent by the *absence of text messages* in the *management overview*. The same interface indicates that there are players in the game, however. It is not plausible that they simply are not 'talking' – i.e., texting one another – so there must be a problem. The controller announces that there is a problem. He and another member of staff then rapidly analyse the problem – instead of leaving the game, captured players have stayed in the game. This means that while the players think they are 'alive' because they can move around the game space they are actually 'dead' and not able to see or interact with others in the virtual workplace. That's the supposition and it needs to be confirmed. The controller issues an instruction via a *text message interface* to players to 'reconnect' – i.e. to log into the game again – if they cannot see other players. He then sets about confirming the supposition. He tries to log into the game so that he can see for himself what is going on there but there is a problem with the machine he is using and he cannot gain entry. He consults the person responsible for the gameplay interface, who is also one of the runners and preparing to changeover with an

49

incoming runner, but no solution is forthcoming. Working out the problem is woven into the stable workings of the game, of making changeovers in this case, which require the content of the runners digital cameras to downloaded before the next runner goes out onto the streets. The other member of staff is downloading the camera contents and the controller turns to him for assistance, asking if the laptop he is working on will provide access to the game and, if so, for him log into the game. Having downloaded the camera content and dispatched the runner, the other member of staff logs into the game and sends a *text message* from the *gameplay interface*. He informs the controller that the message has be sent. The controller consults the *management overview*, where the just sent text is *visibly absent*. Text may be sent but they are not getting through to the game space. The problem is recognised as terminal and the game is restarted. We are 35 minutes into the game and from this point forwards there are no major problems occasioning a full restart. That is not say that technical troubles do not occur, they do, but they of the sort discussed in the runners' work – i.e., handling disconnections, GPS errors and getting stuck. We join the control staff again as the end of the game approaches.

```
Controller: John, can you swap the gamepage on the web in about
    forty seconds.
```
John gets ready to execute the change, selecting and checking the webpage that prevents access to the game.
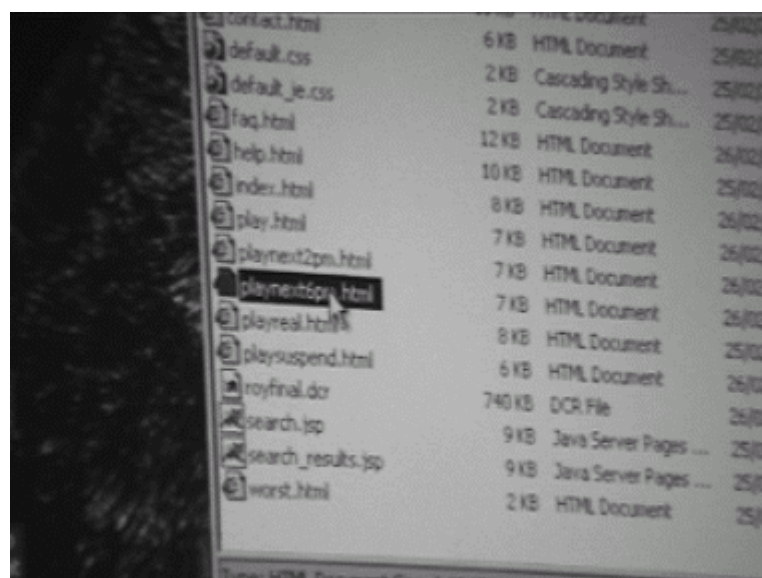

Figure 48. Closing access to the web down.

```
Controller: OK, its 4 o'clock.
```

50

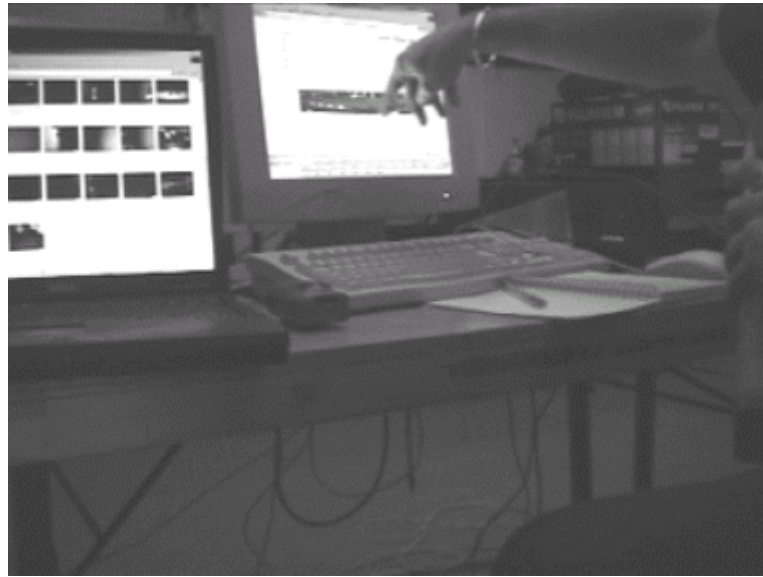John executes the change and brings it up online.

Figure 49. Seeing that the change has worked.

```
Controller on gameplay walkie-talkie: The time is 4 o'clock, we're
not letting any new people into the game.
```

Runner four walks into the control room.

```
John: There's still people in there.
Runner 2: How do you cope without GPS? I don't care if there's a
thousand people in there, if they can't see me they can't fecking
see me can they.
Controller on walkie-talkie: We are not letting any more people
into the game, there are 6 players waiting for you.
```

The team members watch the runners catch the remaining players, chatting about the game. Runner 4 returns to the control room. Runner 1 returns to the control room. The session is over.

Emergent Features

This instance instructs as to the work involved in bringing gameplay to a close. Each session is scheduled to last two hours and the as the allotted time comes to an end the controller notifies the other member of the control staff to prepare to change the gamepage over on the web. At the designated time the controller instructs the other member of staff to make the changeover, which he subsequently *checks* by switching to the *gameplay interface* to see that the change has been effected. The controller then notifies the runners that access to game has been closed. Changing the webpage prevents further access

to the game. It does not remove existing players from the game, however. This means that the game does not end until all players in the game have been caught. Thus, the controller also notifies the runners as to how many players remain to be caught. This is the last in a unique sequence of collaborative actions implicated in the playing of the game, ranging from the *pre-show test*, to *activating the game*, to *playing the game* with all its attendant and contingent troubles, to *closing the game*. It is not all that there is to the game's production, however. Below we consider the work that follows on from live gameplay, which has consequences for each 'next session'.

Following lunch and rest and relaxation period, a post-session debrief was held by the runners and control room staff. The purpose of the meeting was to collate and address problematic issues encountered by the runners and control staff during gameplay. The work of the meeting was designed to articulate *emergent contingencies* and to formulate a *schedule of tasks* addressing those contingencies under the auspices that 'no major tweaks be made' as time was too short to permit major technical work. A list of contingent issues was articulated by the runners and control staff and work tasks were prioritised and assigned to particular members who had the competence to undertake and complete the delegated task and to do so within a specified deadline: the group would meet again at 17.20 for the pre-show test meeting. The following schedule of tasks was formulated as a result of the work described above.

- ❑ **The start up sequence.** As a result of the problems that occurred at the beginning of the game, the runners felt it was necessary to be 'more meticulous about the start up order' – i.e., that they understand and execute the start up sequence properly. Just what was the sequence? Control staff explained.
- ❑ **Where to execute the start up sequence.** Rather than start in different places on the streets, the runners thought that it would instead be better for them to 'go to one place and do the start up together'. Where would be a good place to do that – i.e., a place with good connectivity and GPS coverage? Again control staff explained.
- ❑ **Players rejoining straight into game.** When caught some players were returned straight back into the game, which resulted in them not being able to talk and ultimately in being instructed to reconnect. There was a need to change game so that it put players back at the beginning – to 'take them off the page and reload'. The

game would have to be updated and changes loaded onto the server to make sure this would happen.

- ❑ **Ghost area in the game.** One of the runners experienced inconsistencies with the map that put players and runners in locations they should not have been: *in* the sea and *in* the Port Centre hotel. The maps would have to be checked and updated.
- ❑ **Problems with a particular piece of kit.** Runner four's jornada had been playing up throughout the session with respect to connectivity. The kit would need to be tested on the streets before the next session.

The following hour and a half was dedicated to getting the contingent tasks identified and agreed upon in the group meeting done. The jornada that had been playing up had its software reinstalled. Resolving connectivity problems was a more complex matter. At first it was thought that the waveLAN antennae could be faulty on the troublesome kit as there was good connectivity when the aerial was unplugged. This was the first step in a course of diagnostic work that led to the waveLAN card be tested, which in turn led to the conclusion that someone had been 'messing around' with baystation. The waveLAN was rebooted and successfully tested on the streets. Changes to the game were implemented to make players rejoin the queue when caught and tested by uploading the changed pages onto the server, entering the game, seeing the dummy player in the game space via the management overview, kicking the dummy player out of the game via the queue management application, and then *seeing* that the dummy player was returned to the start up page again. Routine tasks were also accomplished during this period: jornada logs were downloaded and transferred, gameplay stats were updated, and items of kit were prepared for the game. Control staff made sure that the walkie-talkies were in working order, that batteries were fully charged, that GPS units were functioning properly. At 5.20pm a pre-show test meeting was called. The status of all work tasks was checked: all tasks had been completed. Next on the agenda was satellite availability over the duration of the game. The satellite prediction chart became a feature of the group's talk, where it was used to identify potential times at which poor satellite availability would result in interruptions to gameplay.
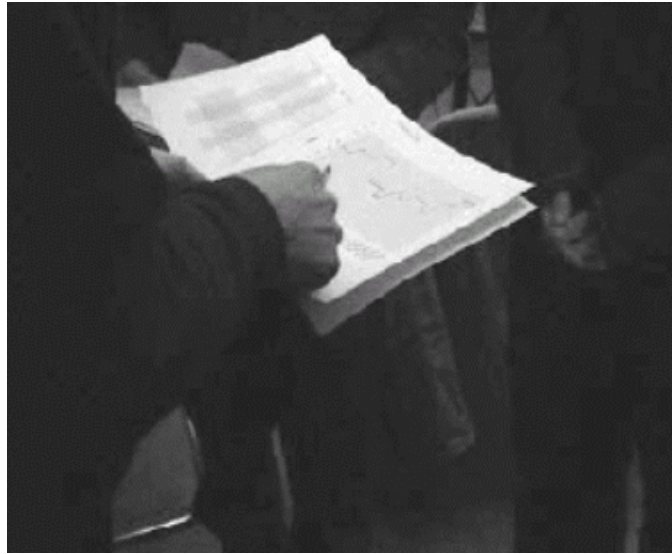
Figure 50. Pre-show test meeting: identifying potential interruptions in the game.

The last 15 minutes of gameplay appeared to be problematic with availability falling off sharply from 8 to 5 satellites. While 5 satellites should be enough to guarantee gameplay, the position of satellites in the skies might mean that only 3 satellites would effectively be available. This, the runners and control staff knew, would cause real and serious problems to gameplay and, hope withstanding, it might be necessary to close the game a little earlier than planned. In other words, the runners and technical staff used the satellite prediction chart to formulate a gameplay strategy to handle foreseeable problems. Next on the agenda was the schedule of runs. Not all the runners were on the streets at any one time. Three out of the four played the game and so a changeover schedule that set out and coordinated the change of runners was required to be formulated. What was the order of runners to be? When were changeovers to take place? Where were they take place? The runners agreed on the initial order of runners (who was to run and who was not, and who was to come in first, second, and third). The changeovers were to take place every half hour, though it was recognised that contingent troubles might effect this schedule. Changeovers were to take place in the control room in order to 'keep things simple' and to make sure that the runner's equipment was working properly. Also, due to technical problems, it became necessary to order the place of the changeover to permit the swapping of batteries between runners, which was best supervised by control staff. The meeting was brought to a close and the runners started kitting up with the assistance of control staff.

Figure 51. The runners kitting up.

The runners then make their way out onto the streets for the pre-show test and the start up sequence is initiated at 17.30 with a member of the technical staff taking the runners to a 'good' location and waking them through the sequence.

4. <u>The Social Construction of *Can You See Me Now?*</u>

When evaluating *Can You See Me Now?* the traditional HCI concern of examining users relation to the interface has been replaced with a concerned to understand how the game's interfaces are embedded in users work. Ethnographic study has explicated a unique game-specific cycle of work activities in which runner and control interfaces are observably and reportably embedded.
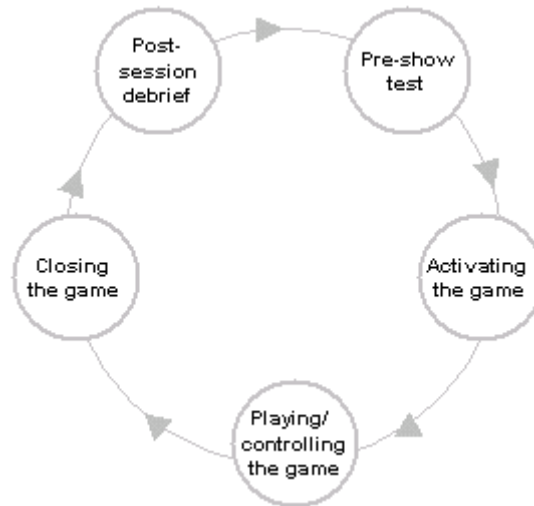

Figure 52. Unique game-specific cycle of work activities.

The cycle of work activities in which runner and control interfaces are embedded is realised through an organic and emergent *working division of labour* composed of a number of distinct constellations and arrangements of direct (i.e., face-to-face or co-located) and indirect (i.e., distributed and technically mediated) collaboration, each consisting of distinct 'jobs of work' and work-practices for their accomplishment. Those arrangements consist of the following:

1. Indirect runner-player collaboration. This is the work of playing the game. It is 'navigational work' and consists of street-specific and game-specific competences and practices of map reading. Here the runners' interface is embedded in the real workspace through ordinary map reading competences and embodied practices to *Project an Intercept Course* to players. Ordinary map reading competences are adapted to *Plot an Intercept Course to the Target Location* and to *Track Players Down to a Specific Location* in the target area and ultimately abandoned for game-specific practices of individual and collaborative *sweeping* to *Locate Players within Specifically Variable Areas in the Real Workplace*.

2. Direct runner-street traffic collaboration. While not a formal feature of the game collaboration between runners and street traffic (pedestrians, bicycles, vehicles, etc.) is unavoidable. The game takes place on the streets and runners are therefore obliged to *coordinate* navigational work with the work of the streets if serious accidents are to be avoided. Accordingly, in accomplishing navigational work runners must exercise ordinary everyday competences involved in walking the streets and crossing the roads.

3. Indirect runner-runner collaboration. While this work is a feature of gameplay it is not concerned with navigational work but with *handling technical troubles* that occur on the streets. Recurrent troubles include disconnection, GPS error and getting stuck. Runners handle these troubles by *announcing* them and the locations at which they occur over their walkie-talkies to their colleagues. This *distributes awareness* of troubles amongst the runners and both contributes to and elaborates a *common stock of knowledge* of the technology's working status in the gameplay environment, specifically where 'good' and 'bad' locations are.[10] It is important to note that these locations are not static by *dynamic*. While some areas may be constantly 'bad', providing poor connectivity or GPS coverage due the physical characteristics of the streets, others come and go as waveLAN status or satellite availability change over the course of the game. In announcing troubles and locations the runners are distributing and reflexively creating an awareness of the technology's *current working status* in the gameplay environment.

4. Direct runner-runner collaboration. In addition to collaborated sweeping in the accomplishment of navigational work, runners also have occasion to collaborate with one another in the course of handling technical troubles and for good reason. It is one thing to encounter technical troubles, another to determine the *scope* of those troubles and the *consequences* they have. The runner's dilemma is this: are the troubles *local* (i.e., mine and of this kit) or *general* (i.e., effecting all runners and of the technical infrastructure)? One way to work out the scope and consequences of technical troubles is to consult the other runners via the walkie-talkies and establish their status. Another is to take advantage of serendipitous meetings, establishing other runner's status directly. A third way, and these are of course combined strategies, is to *surreptitiously monitor* the streets, looking out for

colleagues in order to see their status: i.e., if are they doing navigational work or standing around and other ways visibly encountering troubles.[11]

5. Indirect runner-control room collaboration. In addition to consulting other runners when technical troubles, runners also consult control room staff to establish nature and scope of troubles. Here runners are concerned with such matters as the *walkie-talkie channels other runners are on* (technical or gameplay, which indicates whether or not they are experiencing troubles), *satellite availability* (where good indicates that troubles are local and vice versa) and otherwise relay the troubles that are being experienced in order that control staff may assist in the diagnosis and resolution of troubles.

6. Direct runner-control staff collaboration. Direct collaboration between control staff and runners is occasioned both serendipitously and by intent. In the latter case, collaboration sees control staff go out onto the streets in response to specific problems identified by control staff in the course of monitoring the game or in response to problems that runners have articulated to them over the walkie-talkies. In either case, collaboration is concerned to further analyse and ultimately resolve troubles, which typically emerge from *poor connectivity*. Out on the streets it is control staff's responsibility to identify the sources of poor connectivity, as they may be multiple: has the runner executed the start up sequence correctly, is he or she in a good or bad location, is the waveLAN working correctly and if not, in what ways, is the runner's antennae functioning properly, is the baystation working, are there loose cables anywhere, etc? Collaborative work on the streets between runners and control staff is concerned to resolve such issues and to get the player back into the game.

7. Indirect control staff-control room collaboration. Working out what is causing poor connectivity, and the troubles that may follow on from that, occasions collaboration between control staff on the streets and staff in the control room. Collaboration here is mediated by walkie-talkie but also involves the use of a multiplicity of control interfaces to analyse ongoing troubles and to update positive and negative changes. Thus, and for example, what appears to a 'bad connection' by one runner and result in control staff going out onto the streets to make sure that start up sequence is executed correctly, may turn into a situation where the problem 'kills' the dataspaces and occasions a full restart. As a result

of being out the streets, technical staff may come to understand the factors contributing the problem and issue instructions containing the problem to control staff which are in turn passed on to runners thus *elaborating the common stock of knowledge* of the gameplay environment and the technology's current working status.

8. Direct control room collaboration. Control room work is concerned with *monitoring the status of gameplay* and *fire-fighting* or responding to contingent troubles as and when they occur. Just as the runners' work involved in handling technical troubles one the streets is analytic in character then so too is control staffs' work. Unlike the runners, however, control staff draw on *range of interfaces, including paper diagrams detailing technical infrastructure, distributed across the control room* to conduct that work. The distribution of interfaces reflects the distribution of *competences* involved in identifying, analysing and resolving troubles. While troubles are routinely identified through monitoring the management interface, which provides a view on runner's connectivity and status (via metrics indicating virtual presence) and players' connectivity and status (via the game queue and flow and frequency of text messages), that interface does *not* provide the resources with which analyse emergent troubles. Establishing the cause of poor connectivity, for example, requires the controller to collaborate with the networker to establish a runner's status and to consult waveLAN status in the runner's area. Alternatively, where problems occur with players, members of the control staff must join the game and carry out tests in concert with the controller to identify and resolve troubles. As technical troubles are *essentially contingent* - depending on such uncontrollable variables as satellite availability, weather, wear and tear on equipment, and an unpredictable and chaotic domino effect where one trouble leads to and amplifies another, etc. - there are no routine uses of technology here beyond the collaborations involved in activating and bringing the game to a close. Thus, staff draw on the control interfaces and one another's competences in an *ad hoc* fashion to identify, analyse and ultimately resolve technical troubles as they occur.

9. Indirect control room-player collaboration. Collaboration between the control room and players are rare and entirely problem-based. Only one instance was observed and collaboration was mediated by *text messaging* to instruct players of the nature of the problem and what to do to remedy it. Obviously the distributed character of players prevents direct

collaboration, as with the runners where direct collaboration is essential on occasions where stubborn problems present themselves and restarts are otherwise required.
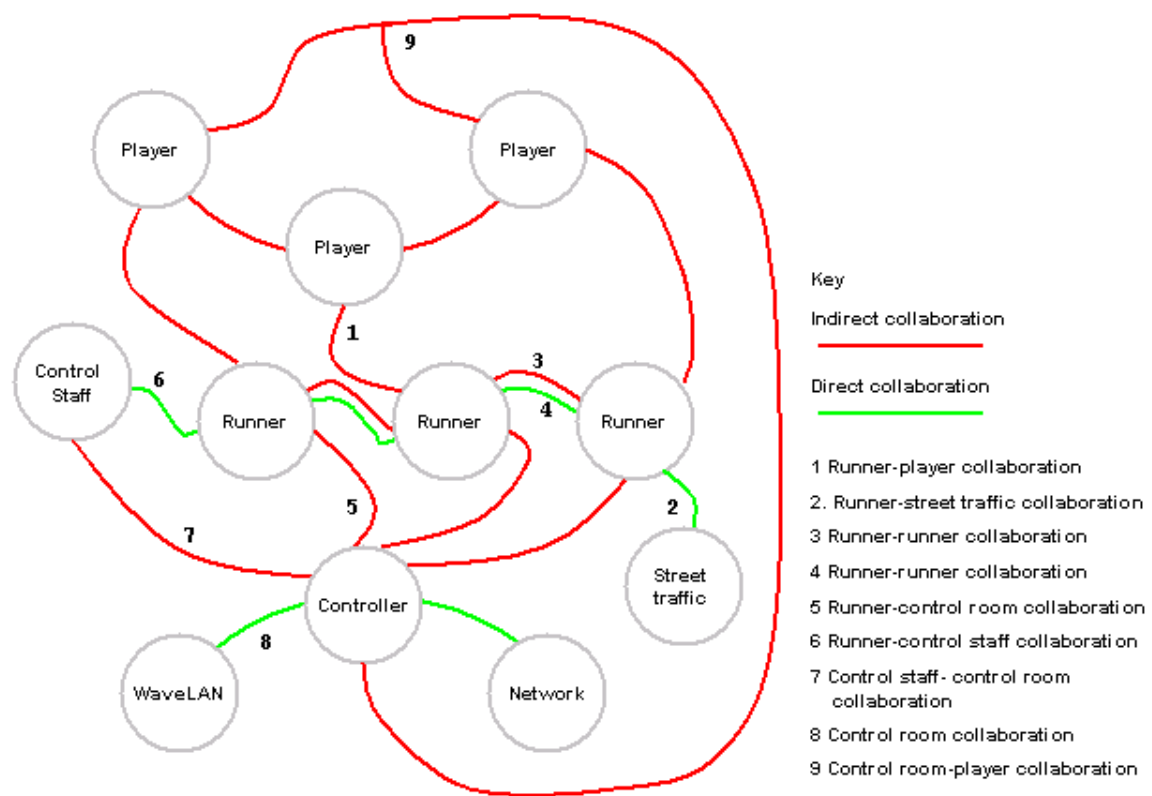

Figure 53. Arrangements of collaboration composing the working division of labour

The cycle is completed by the post-session debrief between runners and control staff, which is concerned to address contingent technical troubles wherever possible and layout a schedule of work tasks to provide for their resolution. It is notable that the account of runners and control room work provided here casts that work as essentially troublesome in nature. The conclusion might be drawn that the technology is inherently unstable and deficient, but this would be an erroneous point of view. While a fair degree of control might be exercised over waveLAN technologies, issues of 'good' and 'bad' coverage, which are a product of the topography of the real workplace, will inevitably apply. Similarly, issues of 'good' and 'bad' GPS coverage will inevitably apply. Consequently, the handling of connectivity problems is not so much an incidental feature of the game's production, one that may be resolved through better design, but an unavoidable feature of game's production. Thus, working out such problems is a *stable* feature of runners' work, a consequence of applying these technologies in the ways that the playing of the game demands, and what control room work is 'all about'.

5. <u>So What?</u>

Ethnographic studies of runners and control room work have shown that the runners' and control interfaces are embedded in 'navigational' and 'fire-fighting' work. Fire-fighting work is not incidental to the game's production but an essential feature of it, occasioned by the variable nature of satellite availability and impact of the built environment on waveLAN connectivity. Technical 'troubles' are an ever-present feature of control room work and handling or managing them is collaborative achievement where distributed competences draw on a range of different interfaces to identify, analyse and concert the resolution of contingent troubles as and when they occur. Existing interfaces in the control room largely provide for the management of emergent troubles, which is to say that control room work is well supported by the technology. This is not to say that nothing more could be done to support control room work, however. While a host of interface 'tweaks' could undoubtedly be carried out to provide a more polished delivery of information and while some basic tasks such as the restart sequence might be automated, perhaps the most notable area for support is articulated by control staffs' use of paper interfaces.[12] Paper interfaces are currently located at the sites at which different competences work (at the network monitor or waveLAN monitor, for example) and provide overviews of the technical infrastructure of various parts of the system, such as the network and waveLAN. Current overviews are fragmented and static then. Developing electronic versions provides the opportunity both to develop a *comprehensive* overview of the technical infrastructure and make that overview *active*, reflecting infrastructural troubles such as loose wiring or the disconnection of components more general as they occur in real time. Furthermore, while it is important to maintain the distributed character of current interfaces in the control room in order to support distributed competences, there may be a case for developing a shared overview of the infrastructure as this would facilitate and extend the mutual monitoring that is already a primary feature of control room work. Figure 54 overleaf provides an example of the kind of interface that is being suggested here and while development might not be on quite such a grand scale, a shared and dynamic view of the overall technical infrastructure might nevertheless be promoted by projecting that view onto a surface in the control room. Such an interface provides a common view on the infrastructure and emergent troubles, which may then be identified, analysed and resolved

through the smaller distributed interfaces furnishing information to the specific competences distributed across the control room.

Figure 54. Shared view of technical infrastructure: at-a-glance visibility of emergent troubles.

There is also scope to develop further interfaces to support the work of runners. An unavoidable feature of navigational work is that it is subject to the contingencies of the technology. Thus, runners must contend with connectivity and GPS troubles as a routine feature of accomplishing navigational work. Unlike the control room there is little support for this aspect of the runners' work. This is not to say that runners have no ways in which to address technical troubles – they do, and the ways in which they do articulate potential areas for support. It is a notable feature of runners work that when connectivity and GPS troubles cannot be resolved by moving to another and 'better' location and waiting for an update that they are presented by a particular dilemma: is the problem 'local' (mine alone and of this kit to-hand) or 'general' (experienced by all runners and of the technological infrastructure)? Our studies instruct us that runners resolve this dilemma in a number of ways: consulting other runners indirectly via the walkie-talkies to establish their status; consulting the control room to establish the status of other runners (which also involves

finding out which walkie-talkie channel other runners are on, technical or gameplay); and surreptitiously monitoring the streets to establish other runners status. Through this work runners come to identify the scope of the problems they are confronted by and take an appropriate course of action. The work is analytic in character and currently unsupported. An interface might be developed, then, to support the analytic work runners engage in to handle stubborn troubles. Accordingly, runners might be provided with information concerning the connectivity and GPS status of their colleagues and the communication channels they are operating on. This would support surreptitious monitoring and enable runners to establish the status of their colleagues. This information might also be accompanied by information concerning current satellite availability, which is routinely appealed to in the face of stubborn troubles. Figure 55 provides a rough schematic view of the suggestion, which may be incorporated as a separate and underlying tab that may be clicked on and viewed when necessary. The schematic utilises a simple colour scheme to indicate connectivity, GPs and satellite availability status.

Figure 55. Supporting surreptitious monitoring in runner's work.

Given the essential character of control room work and the unavoidable contingencies confronting the accomplishment of navigational work, it might also be possible to *augment* the controller's and runners' views of the virtual representation of the real workplace. Augmentation would here be concerned to represent *dynamically and over the unfolding course of gameplay the areas where troubles occur*, where disconnections are experienced, GPS is poor, and runners get stuck. This would reflect the common stock of knowledge built up over the game's duration and, in being dynamic (being constantly updated and changed by 'reading' connectivity and GPS information from the runner's devices), provide real time awareness of 'good' and 'bad' gameplay areas informing control staffs' reasoning about the nature of technical troubles and runners' gameplay strategies for interacting with and catching players.
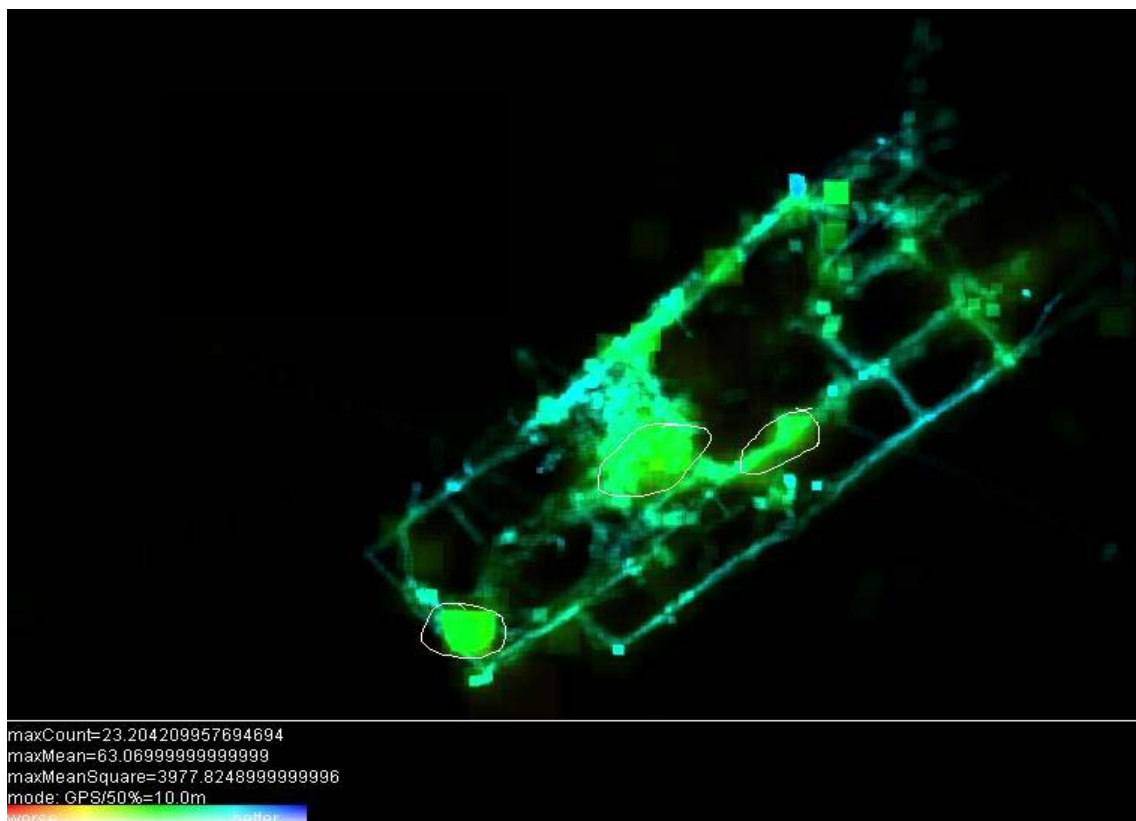

Figure 56. Supporting real time awareness of 'good' and 'bad' gameplay areas.

6. <u>REFERENCES & NOTES</u>

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[5] The players' work is not considered in this report other than in the embodied ways in which runners encounter players in the course of playing the game. The reasons that players' work is largely excluded are practical and methodological in nature. On the one hand the game provided, in principle at least, direct access to the players' work at the site at which it was located in Rotterdam – at an electronic arts festival (DEAF03) to be precise. As a feature of the festival, access to the game was provided to members of the public at the festival site. As a further feature of the festival, that public access point was co-located with other exhibits, many of which exploited sound. The practical consequence of this arrangement of artworks meant that it was impossible to study the lived work of game from the players' perspective as noise from co-located exhibits made it difficult to hear let alone record and subsequently analyse players' talk. The best we could hope to do was to collect a corpus of anecdotes from players reflecting on their experience of the game. While reflections are tremendously useful, they are not the focus of praxiological analysis, however: here, and in a similar vein to Merleau-Ponty's *Phenomenology of Perception*, we want to identify the embodied work that precedes and *gives rise to* reflection. On the other hand, we have the text messages sent between players and runners. These are problematic in that the logs are indexical to the lived work of playing the game. That they are indexical does not mean that they make the lived work of the game visible from a players' point of view, however. On the contrary, the text logs are essentially divorced from that lived work – they are a product of it but they do not show the 'it' - i.e., the embodied work - that they emerge from in the first place. How could they, they are after all *dis*embodied texts. This is not say that the text logs are of no value, only that their use is problematic where praxiological analysis of the game is concerned. As a result of these practical and methodological issues, an interest in players' work is suspended in this report then.

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[10] Such knowledge is also disseminated and built up in the post-session debriefs.

[11] Distributing awareness of technical troubles via walkie-talkie also supports surreptitious monitoring.

[12] It might worth having an interface designer/HCI specialist assist in working out interface 'tweaks' and polishing the delivery of information. While there is little need to do so at the moment, as the interfaces are used by those who built them and the underlying technology, the situation will undoubtedly change as the technology is appropriated by others.