

Secret Identities in Dwarf Fortress

Tarn Adams

Bay 12 Games

Silverdale, Washington

toadyone@bay12games.com

Abstract

Chairs' Note: In this invited industry case study, Tarn Adams discusses recent extensions to *Dwarf Fortress's* systems for character deception. A noted opus in the history of videogames, *Dwarf Fortress* is a roguelike set in procedurally generated fantasy universes. It has been shown at the Museum of Modern Art and has been featured in The New York Times, The New Yorker, Wired, and many other press publications. Currently, Tarn and his brother, Zach Adams, are roughly midway through its famous 30-year development cycle. As Tarn explains in this paper, an upcoming update centered around artifacts—and what characters know about them—has had the fun consequence of necessitating that a certain class of non-player characters cultivate *secret identities*. This major extension has brought both technical and design challenges, as this paper illustrates. —James Ryan

Introduction

The 2017 update to *Dwarf Fortress* (Adams and Adams 2006) centers around named items, and in particular, claims upon the items as well as conflict, theft, diplomacy and reconciliation involving the transfer of these objects.¹ As creatures in the game are not omniscient, rumors passed among civilizations and individuals regarding current item locations are key to preventing this whole process from grinding to a halt. Most civilizations in the game can rely on traders, heroes, migrants and others to produce a flow of information, but *Dwarf Fortress's* goblins don't regularly participate in these processes and need other methods to be fully involved in the update. So we decided to add spies.

Inspirations

Why choose spies to solve this problem? When we were children, my brother and I became interested in making an espionage game after seeing the Alec Guinness miniseries *Tinker Sailor Soldier Spy* (Irvin et al. 1979), based on the John le Carré novel of the same name (which we also soon devoured, along with its sequels; le Carré, 1974). Although

Copyright © 2017, Association for the Advancement of Artificial Intelligence (www.aaai.org). All rights reserved.

¹Chair's note: This paper assumes background knowledge of *Dwarf Fortress*. If any concepts or in-game entities are unknown to the reader, I recommend looking them up in the game's fan-maintained wiki: <http://dwarffortresswiki.org>.

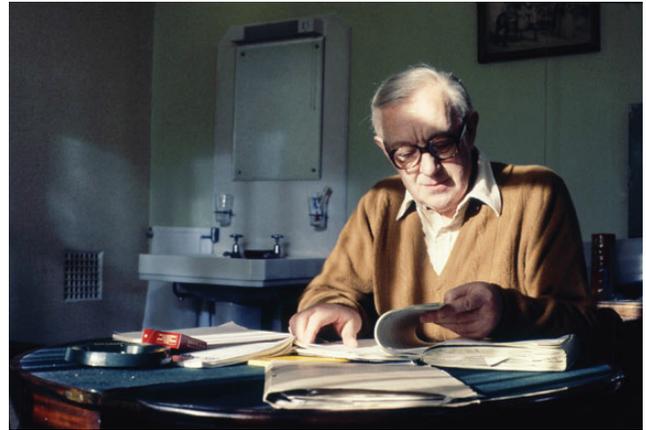


Figure 1: *Tinker Tailor Soldier Spy* (1979) sparked an early interest in espionage methods and how they might be transferred to video games.

it involved plenty of spies, it wasn't a superhuman action adventure, but rather an intricate yet reasonable tale of trade-craft, derived we later learned from actual events and practices. Though we tried, early attempts at creating games using the mechanics of real-world espionage were stymied in part by not having a detailed world in which the characters could act. It's quite feasible to write a directed stand-alone game involving spies, but from a simulation perspective, espionage isn't interesting without an entire surrounding world to monitor, utilize and subvert. *Dwarf Fortress* provided us with a more complete world than we've had access to in previous projects, and with its mechanics as a foundation, we had enough to work with for a spy simulation. To get started, our new goblin spies needed *secret identities*.

Existing Framework and Behavior

Secret identities have existed in the game to a limited extent since the first vampire release in early 2012. New vampiric arrivals to player fortresses disguise their immortality from the player by establishing fake birthdays appropriate for their apparent age, give themselves fake names to avoid being recognized in histories, disguise certain interface elements like their kill lists, ditch any morbid jewelry, and in-

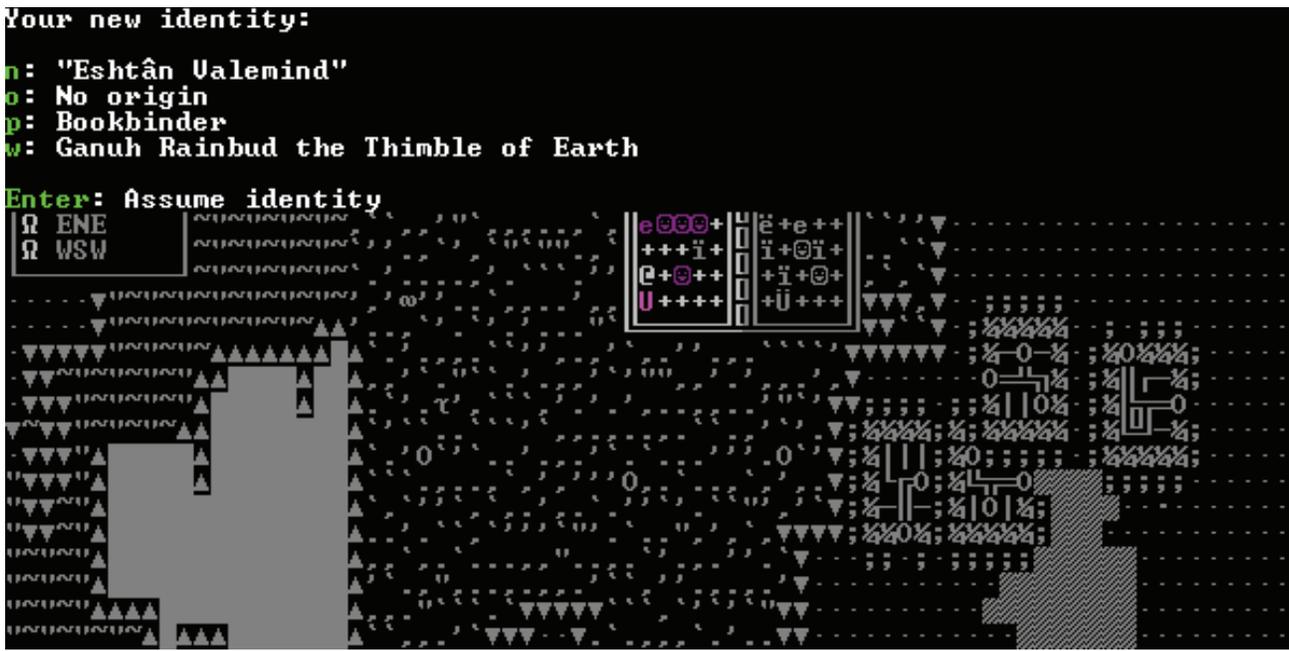


Figure 2: Assuming an identity in adventure mode. Ganuh Rainbud is the pretended object of worship.

entionally avoid using their supernatural physical abilities. These identities served their purpose of allowing vampires to avoid player detection (without some effort on the part of the player, anyway), but it was not crucial at the time to store identities in rumors and witness reports (on-the-fly replacement of the vampire’s true name with whatever identity it was assuming in the fortress worked well enough).

With the addition of our goblin-affiliated spies, however, reputations, relationships, incident objects, rumors, witness reports and other game structures could no longer skate by on interface tricks alone. The player, as a fortress government or, even worse, a lone adventurer, can often be in a position of having a conversation with a spy whose true identity is not known to them, and they might even ask this spy a question which concerns their true identity or a previous alias. This must all unfold in a way which does not draw the player’s suspicions to the spy (at least in terms of constant basic blunders—this was also becoming more of an issue with vampires as more conversation options were added).

Extension to Framework

To this end, the old secret identities were extended to include a cover profession, objects of worship, belief systems, and cultural/government affiliations. A spy for the goblins can pretend to be a prophet, poet, pilgrim, peddler, petty criminal or a number of other professions while seeking to befriend information sources and thereby collect rumors to bring back home. Fortunately, goblin civilizations have many non-goblin members due to kidnappings, and spies are selected according to the possibility of fitting in. Incidents involving the spy store the true identity of the spy, in order to keep the game honest, but the player never sees this data and can only interact with rumors and eyewitness accounts

of incidents, which now store the current identity (if known) and a visual identification (if seen).

Each historical figure in the game, within limits, stores its relationship with any historical figure it has met. In order to accommodate secret identities, these relationships were broken into three states. At the most abstract, a relationship can be by secret identity only—if somebody heard a rumor that, say, Urist (an alias) was in a barfight, they’d be able to talk about Urist the bruiser, but they would not recognize them on the street. At another state, the true historical name of the related figure is known—this might as well be another identity, but for compatibility purposes, it had to be stored separately.

The third state of a relationship is visual. This doesn’t necessarily mean the figure in the relationship knows any information about the person so identified, and they might only have an alias (or nothing at all), but they do store the number of times they’ve met, the time of the last meeting, and any reputation information. If the subject or an eyewitness links the visual identification to a name, these states can be combined.

Importantly, aside from the deception involved in the identity itself, no rumors in the game can be false, so we don’t have to worry about contradictions when combining or storing information. Another weakness of the current system is that two identities cannot become permanently linked without a visual identifier or true name (though this is a straightforward extension). Identities can be associated to each other temporarily through eyewitness reports if the eyewitnesses know the target by multiple aliases, due to the way reputations are calculated dynamically until incidents time out (when some information is culled).

Tholtig Mengthibam, "Tholtig Lashedhushed"

In the early spring of 80, Tholtig visited Helmeddrunken to gather information.

In the late summer of 84, Tholtig, as "the bard Zaneg Crysmith of The Relieved Doors", formed a false friendship with Cog Wavelanced in order to extract information in Helmeddrunken.

In the early spring of 85, Tholtig settled in Standardshove.

In the late winter of 86, Tholtig visited Salvepale to gather information.

In the early autumn of 96, Tholtig, as "the bard Zaneg Crysmith of The Relieved Doors", formed a false friendship with Kadol Dikepresent in order to extract information in Salvepale.

In the midwinter of 97, Tholtig visited Uiselabors to gather information.

In the midwinter of 97, Tholtig fooled The Empire of Bulwarks into believing she was "the beast hunter Uthret Leaffountains of The Empire of Bulwarks".

In the early winter of 99, Tholtig, as "the beast hunter Uthret Leaffountains of The Empire of Bulwarks", formed a false friendship with the human Inan Streamscald in order to extract information in Uiselabors.

In 102, Tholtig became a baroness of The Razor of Pines.

In 102, Tholtig settled in Lengthbronze.

Figure 3: One agent's duplicitous interactions with various communities.

Changes in Behavior

The extension of secret identities to include impersonated cultural and government affiliations required changes to the behavior of creatures wherever interpersonal relationships arose. The already-involved question of "what do you think of somebody?" is no longer answered by pulling the relationship profile indexed by the subject's ID number, but by pulling the correct relationship profile based on the context. These queries needed to be updated on a case-by-case basis. For instance, can you see the person or are you hearing about the person with a visual description? Then you can pull the visual profile (and maybe even combine two profiles together). Are you being asked what you think of somebody by name alone? Do you have a matching identity profile? How much do you know about the identity? Did you learn their (possibly fake) government affiliation? If so, what do you think of that government? Be sure to include reputation effects from any related government incidents, and any general government-based modifiers, such as the tendency to hide true opinions from occupying forces.

As an example, Aliz might have the rumor "Urist (an alias) stole an amulet from Kogan", in which case Aliz's reputation calculation for Urist includes their thoughts on both people. If Kogan is hated, their thoughts on the identity 'Urist' might be positive. If Urist is a spy, unknown to Aliz, Aliz would still view this as an incident between citizens of the same town and not assign the true culprits (the goblins) any blame at all. If Aliz knows Urist's true identity as a spy of the goblins, they'll pull a more complete profile and assign blame properly whenever thinking about that goblin civilization more generally. As long as Aliz is unaware of the spy status, though, having met Urist in person is no guarantee—they might even be conflicted about the theft if they consider Urist a friend. In certain extreme circumstance, even a known spy status cannot overwhelm positive feelings of friendship, a romantic relationship, or the rare circumstance that Urist and Aliz might be related (a kidnapped sibling come to adulthood, perhaps).

People pretending to belong to a different culture also

have the difficult task of deciding which of two ethical codes to follow in every situation where such considerations arise. For instance, goblins in their home environment kill outsiders on sight, whereas spies in early testing found this habit to be quite disruptive upon arriving in town! In order to simplify the update, we only handled those truly problematic situations which we identified. Otherwise, goblin spies continue thinking like goblins, and might blow their cover with an inopportune opinion (though only the player might notice). Spies posing as prophets produce prophecies not necessarily related to religious canon (for instance, a false prophet might claim that a fire god is going to destroy the world with a flood, which will tip off the astute player). Ideally, we'd have spies with varied cover qualities, with an experienced and talented spy able to mimic the target culture's value set.

There are various interesting edge cases caused by the inability of the game to handle lies (aside from aliases). If you ask a spy to point you in the direction of themselves (by their true name), they refuse to blow their cover, but they also can't lie about locational facts. So they say that "that person is nearby." If you somehow manage to hire them to guide you to this person (themselves), they'll declare the task done immediately and pat themselves on the back for a job well done. These situations can be easily managed (by pleading ignorance, say), but first they need to be identified as problems, and resolving each one takes development time. Several remain as of this writing (85 known, most of which we are hoping to handle before the update).

Future

Visual identity profiles are as simple as possible right now—it just uses the ID number of the person in question. This doesn't respect appearance or clothing (or shape-shifting!). Adding witness reports that refer to clothing and physical characteristics create some complications when it comes to data storage and determining that two visual identities are close enough to combine two rumors or reputation profiles, but these problems seem manageable and would make the

criminal justice system and other aspects of the game much more interesting. Spies would have to concern themselves more with proper hairstyles and proper dress.

There's also the matter of handling more general lies. In our context, we'd need to decide whether a rumor is accepted by somebody that hears it, to whatever extent, especially if they have other related information, and then the issue of whether they keep only one truth or save both to weigh as more evidence might present itself (which by itself is a difficult problem). It's attractive to keep everything and let them sort out what they actually think on an as-needed basis—the way we handle recent incidents vs. reputation—but there are memory and processor concerns with this as more and more kinds of lies spread among potentially tens of thousands of individuals. Secret identities are one specific form of lie, and that alone required significant work. It's possible that types of lies will continue to be added to the game in this fashion, one by one, rather than just allowing rumors to hold incorrect data as a single sweeping change.

With the initial release, the player might try their hand at stirring up trouble under an alias, maybe to cover themselves after a fistfight in a bar. They might notice the new mechanics at work when the game announces that one of their dwarven citizens has given up information to a now-departed traveler, or if they read a generated history involving a famous spy. At the same time, these secret identities aren't fully engaging from the player perspective, since their addition centers around the collection of artifact information, which isn't yet a key part of *Dwarf Fortress*. We hope that as the mechanics are strengthened and tied in to other parts of the game, more and more intricate spy stories will emerge online as players share their experiences, and perhaps one day they'll be able to leap into a le Carré story of their own.

References

- Adams, T., and Adams, Z. 2006. *Slaves to Armok: God of Blood Chapter II: Dwarf Fortress*. Bay 12 Games.
- Irvin, J.; Powell, J.; Hopcraft, A.; and le Carré, J. 1979. *Tinker Tailor Soldier Spy*. BBC2.
- le Carré, J. 1974. *Tinker Tailor Soldier Spy*. Random House.