## **Dialogue Agents Model**

We follow our synopses of the robust, multi-functional OSC and CiF models with two additional ones of which within the scope of this report are only partially utilized as to extract smaller components thereof for particular use with personality and social simulation; but note that for a full realization of the Fëa composite model: each would be more substantially utilized. The first of these is the Dialogue Agents model which is not necessarily a model as much as a summary paper identifying design patterns for dialogue within video games compared with corresponding case studies. We utilized it WRT to the scope of this paper as to provide a bit more context into the nature of communication between both NPCs with each other, as well as with PCs (i.e. humans). It foremost defines conversation dialogues between agents in video game / virtual simulation worlds as a “means for agents to exchange and coordinate information, build social cohesion, and achieve mutual understanding”, for which CiF provided similar observations.

## **Dialogue Types and Elements**

Two main types of dialogue are defined, as well as three types of ‘elements’ which compose them (of which we’ve slightly adapted for use with Fëa). All three elements are familiar from the discussion so far: PCs which are human players, NPCs which are autonomous agents, and OCE’s which are ‘Observed / Communicated Events’. We admit that OCE’s bend the convention a bit but are important as to help unify the representation of information and events between this model and OSC, CiF, and Needs-Based as also presented in this paper / part of our conceptual composite model. OCE’s represent either an observation that has been made by some character (e.g. ‘NPC x sees arriving UFO’) or an event that has been communicated to a character from something other than another character (e.g. ‘NPC y watches a news report about the arrival of a UFO’) For the purposes of our brief discussion on Dialogue-Agents given the limited scope: OCEs are only mentioned without further immediate consideration. As to the dialogue types, they follow from the elements. [PC-NPC] encompasses a human having a dialogue exchange with an NPC. The paper partitions human players (i.e. P) from the player-characters a.k.a. ‘avatars’ whom players control within the game world (i.e. PC), but this is unnecessary for our purposes, thus we resolve both accordingly into the single type. The purpose of such dialogues are classically to provide the player with exposition, quests, and other information, while having a peripheral purpose of ‘filling empty space’ by providing some basic social exchanges from pre-baked dialogue trees. The other dialogue type is [NPC-NPC], which encompasses an NPC having a dialogue exchange with another NPC. The purpose of these dialogues are classically to comment on the states and events of the game world, for which most implementations even to present realize in a very limited sense (e.g. via locking and/or unlocking pre-scripted dialogue trees based on activated triggers specifying the occurrence of world events). CiF and OSC, however, propose a vast expansion of the effects of dialogues between both PC-NPC and NPC-NPC. This expansion includes dynamic social context/state changes (i.e. conversation goes badly if player gives NPC bad news), types of dialogue available WRT robust personality simulation and emotional state (i.e. not just limited to unlocking new dialogue if ‘charisma’ stat is >50, can realize WRT “PC is confident, has a friendly demeanor, and is dominant over the NPC; NPC is agreeable, somewhat likes the PC, has good solidarity with PC, and does not feel threatened by PC – such will unlock the ability to ask several questions for which the NPC will not otherwise be willing to answer”

**Agent-Based Dialog Systems / Turn-Taking**

There are two important and somewhat coupled topics within this paper, for which the first provides us with a definition for Agent-Based Dialog Systems given the aforementioned introduction. The second idea is ‘turn taking’, which encompasses how ‘moves' (ply’s?) in a conversation are organized and distributed. Ergo to begin: the paper establishes an ‘Agent-Based Dialogue System’ as one which satisfies a principal requirement that follows from our main theme/requirement of ‘Behavioral and Contextual Consistency’. Specifically, it states that (paraphrased due to brevity) ‘[realistic] conversation requires agents with the ability to re-plan towards achieving existing goals xor defining new ones whenever its priorities change - especially for dynamic simulation worlds wherein preconditions and/or circumstances required to execute the current plan or goals may frequently change”. We mostly bring this up to, once again, connect the goal- planning / action-taking / decision-making behavioral systems not explicitly discussed within this report but whose shadows still affect our full realization of a consistent ‘NPC Framework’ as is our goal for the full Fëa model; given that those systems are affected by and affect personality / emotion / attitude / social simulation models that the partial version of Fëa modelled in this paper does involve.

There are two kinds of turn taking discussed in the paper. The first is 'Incremental Dialogue Processing' of which encompasses human-to-human conversation, wherein interrupts "are possible [because] the hearer can process and react to each contribution while it’s being produced." Chunk-Based Dialogue Processing involved a more restricted alternative which only allows communication via "utterances or phrases" (a.k.a. ‘blurbs of text’) transmitted as a whole; which has been and remains the convention for many open-world RPG games for which we aim to drastically improve via models like Fëa. In either case, we note that the spaces between moves is analogous to state transitions, for which we discuss further WRT implications with OSC/CiF in 'Affective Dialogue' below. However, there is a middle ground between Incremental and Chunk-Based dialogue processing, especially vis-à-vis NPC-NPC dialogue exchanges, in the form of Interruptible Actions. Such actions allow an NPC to interrupt an ongoing conversation (perhaps even those of which it is not [yet] involved i.e. to reject/refuse participation in a conversation). Of this, we first note the clear connection between the mechanism of NPC’s rejecting conversations given their attitude and personality via both the CiF and OSC models, their emotions given the OSC and upcoming Needs-Based AI models, and their memories of prior exchanges given the CiF model. Furthermore, we note that via structuring the interruption as an event (i.e. by definition via the OSC model), we could further implement the ability for the interlocutors to express objection to either a rejection for conversation by a receiving NPC (e.g. as to ‘bark’ back a response such as “Hey get back here! You’re going to listen to what I have to say!”), xor an interruption between two conversing interlocutors by a 3rd party (e.g. the classic “How rude of you! Can’t you see that this conversation is between ‘A’ and ‘B’, so why don’t you ‘C’ yourself out of it!”)

## **Affective Communication**

We finish what has been a comparatively brief synopsis of the Dialogue Agents model discussion of a very important idea called Affective Communication and its implications on NPC Personality and events as defined by OSC and the CiF SFKB. To begin, Affective Communication is a crucial enhancement to dialogue methods of which helps satisfy consistency. It involves influencing the NPC's disposition towards the PC (or other NPCs for an NPC-NPC dialogue) via emotion-based responses (e.g. Admire / Intimidate / Taunt / Bribe). There is already precedent with affective communication as can be seen with many of the open-world RPG games such as Bethesda’s ‘Fallout’ and ‘Elder Scrolls’ serials; despite remaining relatively limited/simplistic by largely involving pre-scripted dialogue and event sequences versus the kinds of emergent, procedural realizations sought by Fëa and its module components. However, we note from this precedent clear examples for how such dialogue options can affect game state by doing everything from setting a character hostile to activating some event trigger in the game world; and especially: changing the flow of not only future conversations but the current conversation (i.e. via either locking xor unlocking dialogue choices). With a fully procedural and emergent realization, these effects stand to be rapidly enhance, encompassing two major implications for such a realization. The implications on NPC Personality involve a much more ‘familiarity-driven’ approach for how a character can persuade another character to become friends, provide information, do or don’t do a certain task, etc. This extends to NPC-PC relations as well; as a ‘crazy’ possibility for robust enough NPC intelligences is to actually turn the tables around and manipulate the actions and thoughts of human players! This would encompass an analog phenomenon similar to what we call the ‘Iteration 2 Turing Test’ as inspired by the 2014 film ‘Ex Machina’, wherein the goal is for an artificial agent to successfully deceive a human who is clearly aware that they are engaging with an AI. Furthermore: we propose in our conclusion that the ‘Big Experiment’ we envision realizing may be able to not only implement this test, but possibly even pass it! Finally, we close discussion of the Dialogue Agents model with its Implications on OSC events and their analogs in the CiF SFKB. The paper notes that major precedent such as ‘Elder Scrolls IV: Oblivion’ and ‘Mass Effect’ also use dialogues to provide information to players about the game world and to progress the various plots. Further, in complement to CiF's means of expressing intentions through dialogue (e.g. the 'revenge' example thereof), this model also speaks about how to effect more subtle communication of facts and intentions via 'Illocutionary Forces'; of which the best way to quickly define such expressions is through example. Ergo: given the scenario of a father who asks his son on a Sunday morning to mow the lawn by sundown the same day, an ‘illocutionary force’ would be the father asking his son sometime in the afternoon: “Hey pal! How’s that lawn coming along? Does it look nice and neat yet?” The paper expresses as greater meaning to such phrases as they could "either change the game world or narrative progress as to not be apparent to players before they make such utterances. We further believe that illocutionary forces are ‘on the same level more or less’ as emotion/personality-oriented sarcasm and hyperbole; and understand/respect the weight of our words when we wonder if these models could be able to express such means of communication fully procedurally; and NOT by means of a chatbot nor learned model [someone get on the phone with Clay and Mihai, STAT!]