



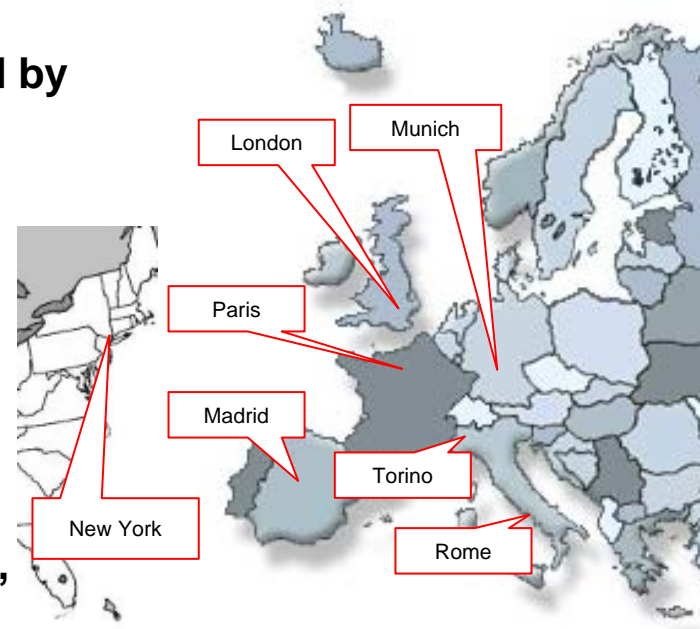
New enabling features for in-car speech-based advanced applications

Paolo COPPO

VP Marketing & Business Development



















































- ❧ Privately held company, founded in 2001 as spin-off from Telecom Italia Labs, capitalizing on **30yrs experience and expertise in voice processing**.
- ❧ **Global Company**, leader in Europe and South America for award-winning, **high quality voice technologies** (synthesis, recognition, authentication and identification) available in **27 languages** and **64 voices**.
- ❧ **Multilingual, proprietary technologies** protected by over 100 patents worldwide
- ❧ **Financially robust, break-even reached in 2004**, revenues and earnings growing year on year
- ❧ **Growth-plan investment** approved for the evolution of products and services.
- ❧ **Headquarters** in Torino, Italy with local representative sales offices in New York, Rome, Madrid, Paris, London, Munich



- » **To provide our customers with a complete set of speech technologies (TTS, ASR, SV), guaranteeing:**
 - » best-of-breed quality and accuracy
 - » innovative features
 - » multilingual worldwide coverage
 - » competent technical support at a competitive price
- » **To facilitate adoptions of Loquendo products by extensively supporting international standards**
 - » All speech-related W3C and IETF standards
- » **To offer a full range of integration options**
 - » APIs, standard interfaces and protocols, client-server configurations
- » To provide our technologies on the **widest spectrum of platforms for server, desktop and embedded (Windows, several Linux distributions, Win Mobile, iPhone, VxWorks, QNX, Symbian ...).**
- » **To significantly invest in R&D** in order to progressively extend our language portfolio, develop new features, protect our IPR and constantly improve performances.



Language Coverage

Language	Female	Male
English US		
English UK		
English AU		
Spanish (Castilian)		
French		
Canadian French		
German		
Italian		
Russian		
Greek		
Portuguese		
Danish		
Finnish		
Swedish		
Dutch		
Polish		
Turkish		
Brazilian Portuguese		
American Spanish		
Mexican		
Chilean		
Argentinean		
Colombian		
Chinese		
Galician (bilingual)		
Valencian (bilingual)		
Catalan (bilingual)		
Norwegian (12/ 2009)		
Arabic (2010)		



- ▣ **The focus today all towards ASR and “natural language”, but what about TTS?**
 - ▣ **How much time do we use ASR during navigation vs. how many driving directions we hear?**
 - ▣ **What’s the impact of a “Natural” TTS prompt vs. a “less pleasant” one in a Natural language interaction?**

- ▣ **What is needed from a TTS in an Automotive Scenario?**

Car Maker Requirements



Loquendo
VOCAL TECHNOLOGY AND SERVICES

Automotive Speech Solution

A stylized map showing a red route. A speech bubble at the top right says "At the intersection, turn right into Madison Avenue". A speech bubble at the bottom left says "Take me to the Railway Station". A blue arrow points to a red road. A blue 'P' icon is on the left, and a blue coffee cup icon is on the right. A red banner at the bottom contains the text "www.loquendo.com".

"At the intersection, turn right into Madison Avenue"

"Take me to the Railway Station"

Text to Speech

Speech Recognition

www.loquendo.com

- ▮ Quality: “replacing pre-recorded” → Best of Breed state-of-the-art TTS
- ▮ Seamless integration with a built-in set of prerecorded messages
- ▮ Graphic tool for Prompt Editing, Tuning & Testing
- ▮ Extensive language and persona coverage, with NO quality discontinuities among languages.
- ▮ Footprint Flexibility: Need to fit in the device without increasing the BOM
- ▮ Mixed Language Capability: your native language TTS voice must be able to speak foreign languages
- ▮ Navteq and Teleatlas integration: be able to read phonetics
- ▮ Must be able to interpret SMS jargon
- ▮ Be more human, “emotional”: it’s *your* car!

Car Makers require a complete solution for automotive telematics, not simply a TTS.

A bit of history ...

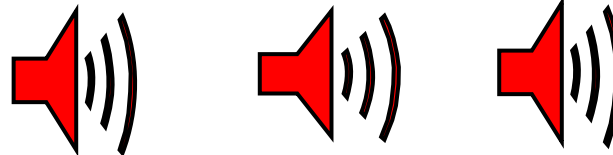
1978 **MUSA**: first Italian
synthetic voice



1993 **ELOQUENS**: diphone-
based



2000 **Actor**: 3^o generation
unit-selection TTS



AVIOS-SpeechTEK West Awards

2007 “Best Innovation in Text To Speech – Automotive Solution”

2006 “Best Innovation in Speech Synthesis - Emotions”

2005 “Best Innovation in Multi-Lingual Speech Synthesis”








Start from a state-of-the-art engine

Loquendo has been the pioneer to launch a unit-selection TTS on embedded devices back in 2004.

Formant or Diphone-based system are now outdated, HMM-based yet to be improved.

Unit-Selection :  Festival + HTS :  Android 1.6 : 

Specific automotive database

In response to the fear of loss of quality due to entire TTS use in general navigation prompts, Loquendo has created a specific additional database with more than 400 sentences commonly used by navigation systems that are rendered at pre-recorded quality.

#	Pronunciation	English
1	Suspensive	in 50 meters,
2	Suspensive	move into the slip road
...	Suspensive	at the roundabout
168	Conclusive	take the third exit.





Vocal Add-ons

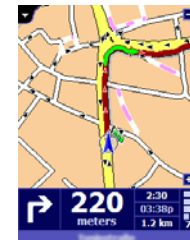
In case a special intonation or expressivity is needed for those fixed prompts which are recurrent and crucial in your application, a Loquendo voice can be enhanced with ad-hoc speech material.

The desired prompts can quickly be packed into a Vocal Add-on, to be installed with the base voice.

The experience for the programmer is seamless, the TTS engine takes care of all.

TeleAtlas and Navteq speech-enabled map compliancy

Loquendo Embedded TTS fully supports TeleAtlas and Navteq SAMPA phonetic alphabets, increasing the quality of the speech rendering when reading addresses, sign posts and POI, in any language, leveraging on the mixed language capability





Special Automotive Lexicons

Language by language, Loquendo has created special automotive lexicons to correctly expand automotive acronyms (e.g. blvd for boulevard) and highway names (e.g. US101).

Footprint Flexibility

Our voice databases can be tailored and compressed to suit each customer's specific memory/storage constraints depending on their chosen platform and device constraints.

SMS Text Messages reading

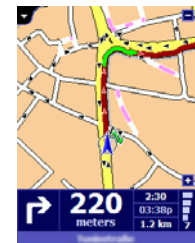
Special Lexicons for SMS are available for 8 languages (e.g. "b4"= "before").

SMS reading

r u don nethng 2mor? would b
gr8 2cu.

i'll b @ pub b4 8.

ringl8r. b4n xoxox susan



Expressivity and personalization: give character to your user interface!

Feel the difference:

NORMAL: “For the motorway, take the second exit”

FORMAL: “*Throat*, Sir, for the motorway, please take the second exit”

INFORMAL: “Hey John, for the motorway, take the second exit, *ok?*”



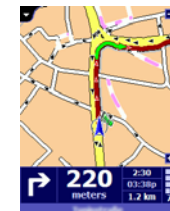
For entertainment purposes or to convey certain types of messages, a humorous style can also be adopted

HUMOUR: “*Uh-oh* you’ve gone the wrong way, *hmm*, do a u-turn as soon as possible”



Mixed language capability for reading foreign street names

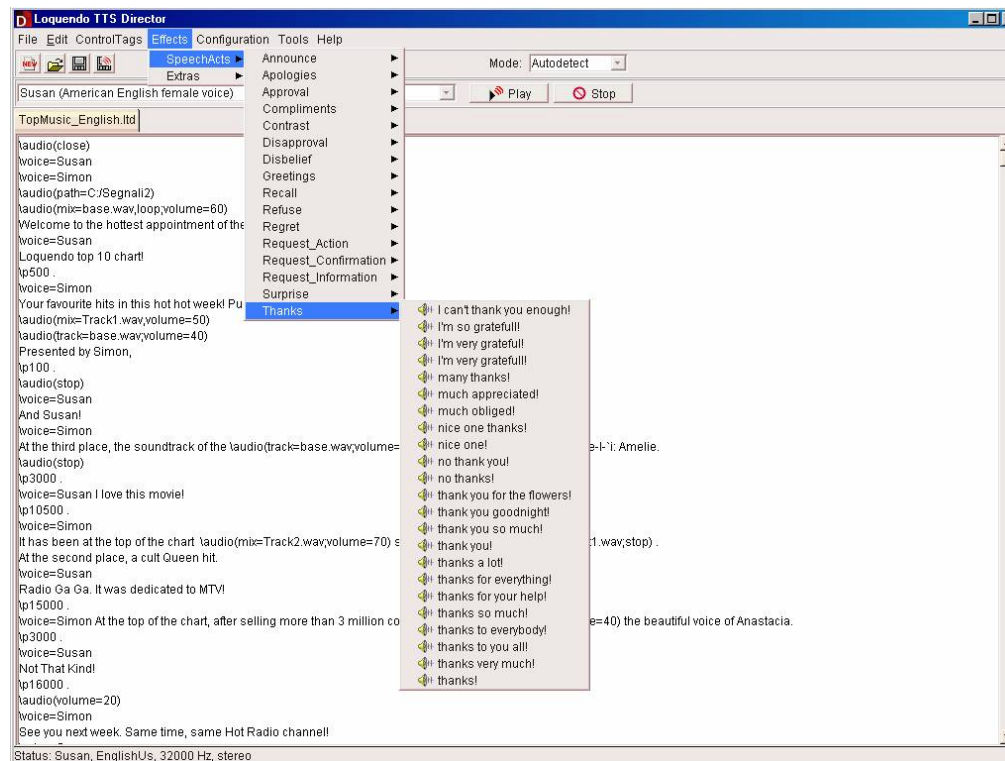
Each of our voices is able to speak any other available language! This means that for example, our Italian voice can speak English with an Italian accent, or a French voice speak German with a French accent. This unique and patented feature is extremely useful for address reading.



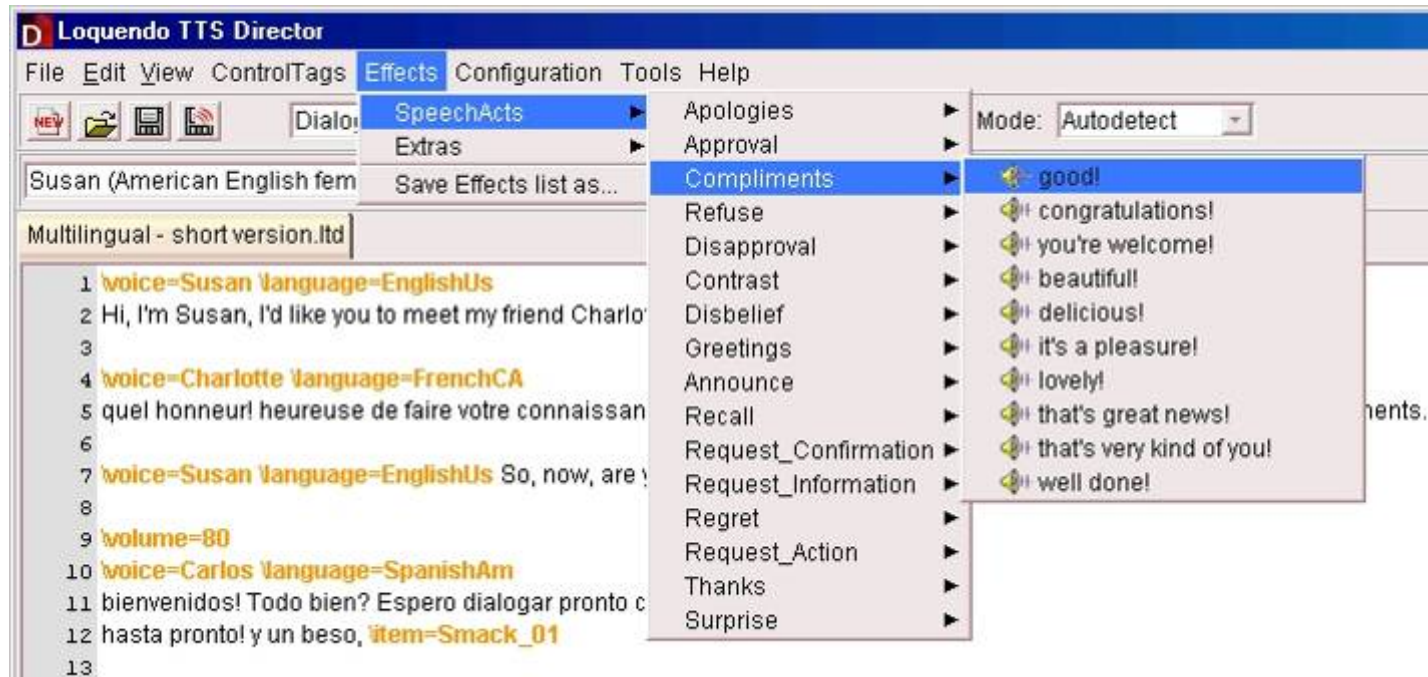
- Loquendo TTS Director is a complete development environment for creating your own voice prompts, and for designing your own personalised voices.



Target: clients wanting to edit their prompts at a more complex level and adjust parameters with far more precision, as well as to add pauses, phonetic transcriptions, and tailor-made lexicons for atypical pronunciation.



- » The **Effects** menu smoothly guides users through the software's advanced features, which include **expressive cues**, such as greetings, exclamations, apologies, etc., and **paralinguistic events**, such as coughing, kissing, laughing, etc.
- » Enriched TTS continues to benefit from the **high quality and natural timbre** achieved with the Unit Selection technique



- Compliance with **SSML 1.0**
- Syntax highlighting
- Syntax validation available

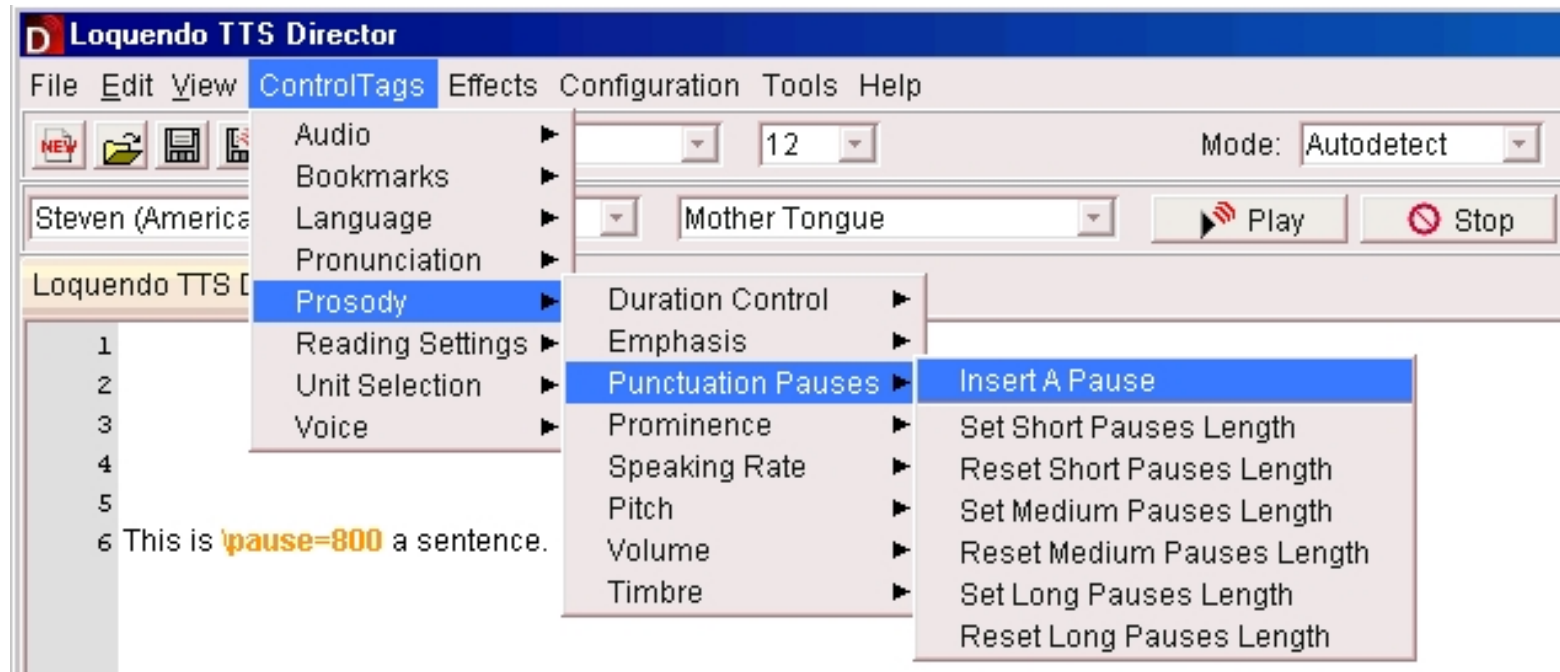


The screenshot shows the Loquendo TTS Director interface. The main window displays an SSML file named 'SSML_Example.ssm1' with the following content:

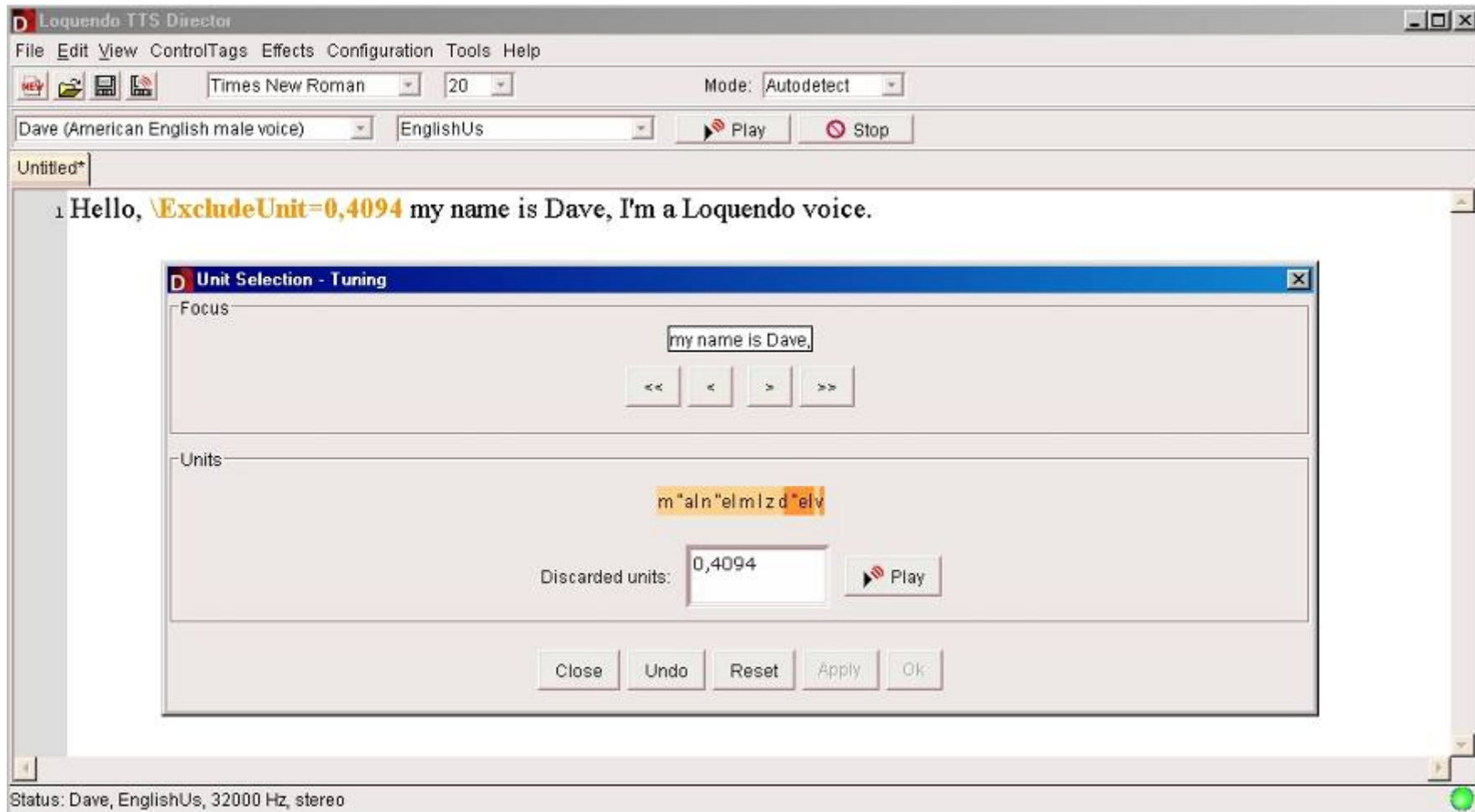
```
1 <?xml version="1.0"?>
2 <speaK version="1.0" xmlns="http://www.w3.org/200
3   xmlns:xsi="http://www.w3.org/2001/XMLScher
4   xsi:schemaLocation="http://www.w3.org/2001/1
5     http://www.w3.org/TR/speech-synthesis/s
6     xml:lang="en-US">
7   <!-- This is an SSML 1.0 example -->
8   <voice gender="female">Hello, I'm a Loquendo female voice. <break time="1s"/>
9     Let me introduce my friend Dave...
10  </voice>
11  <voice name="Dave">Hi. I'm Dave. It's very nice to meet you!</voice>
12 </speaK>
```

A 'Validation OK' dialog box is overlaid on the right side of the code editor, displaying an information icon and the text 'No errors to report' with an 'OK' button.

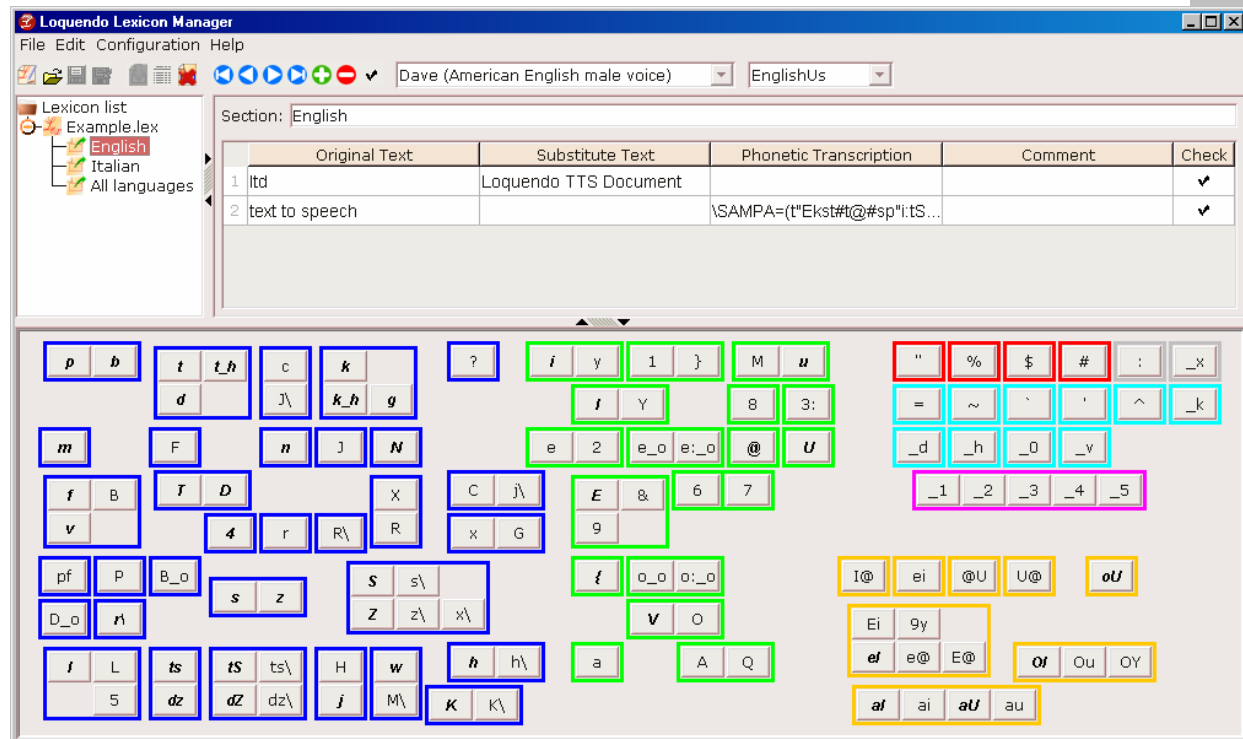
- **The Control Tags menu** provides access to Loquendo's TTS Control Tags
- Command tags inserted into the text enable a synchronized change of **voice, language, prosodic parameters, pronunciation, reading settings, unit selection, audio mixer, etc.**



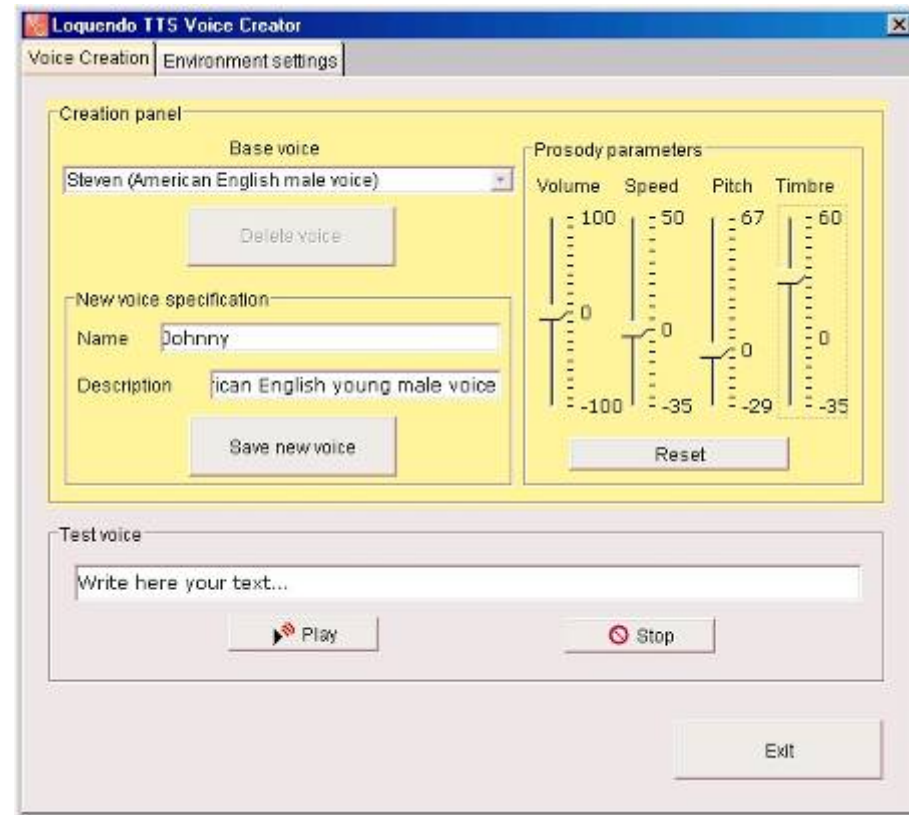
User-Driven Unit Selection Tool



- With the Loquendo Lexicon Manager a User Pronunciation Lexicon can be created:
 - List of transliterations or phonetic transcriptions
- Helps in defining the pronunciation of foreign language words, place names, proper names, acronyms, abbreviations, etc.
- The virtual keyboard helps in writing the phonetic transcriptions
- Sections for different languages in the same lexicon
- Support for the PLS (Pronunciation Lexicon Specification) standard format, IPA and X-SAMPA



- With the **Voice Creator** tool it is possible to change the parameters of a base voice and save the modified settings as new voice
- The new voice will be immediately available in the voice menu list
- The new voice can be used just like any other voice



Thank you !

Loquendo Automotive Solution is the right choice for the Market Leaders



- Loquendo TTS let the User control the exact pronunciation of words
- An escape sequence in the input text allows skipping the grapheme-to-phoneme process driven by the Language Library...
- And inputting the desired phoneme sequence directly to the Speech Synthesis process based on the Vocal Data Base

- » The default phonetic alphabet used by **Loquendo TTS** is **X-SAMPA**
- » All languages have their own set of phonemes
- » However, cross-language phonetic transcriptions are correctly interpreted thanks to the [phonetic mapping algorithm](#)
- » Useful when using the **Loquendo Lexicon Manager**
- » Coming soon:
 - » Complete IPA support in Loquendo TTS engine
 - » Support for IPA alphabet in Loquendo TTS Director and Loquendo Lexicon Manager

