



# Truly Hands Free Today and Tomorrow

By Sensory

# Truly Hands Free - Today

- There are **MANY** products in the market today that use voice triggers
  - Samsung Mobile phones
  - Samsung Tablets
  - Samsung Cameras
  - LG mobile phones
  - Motorola Mobile phones
  - Google Glass
  - Honeywell Thermostats
  - Bluetooth Headset & Car kits
  - Clocks, Lights, etc., etc.



# Key Markets for Truly Hands Free

- **Markets**

- Automotive
- Kitchen and Home
- Mobile
- Wearables
- Cameras

# Automotive

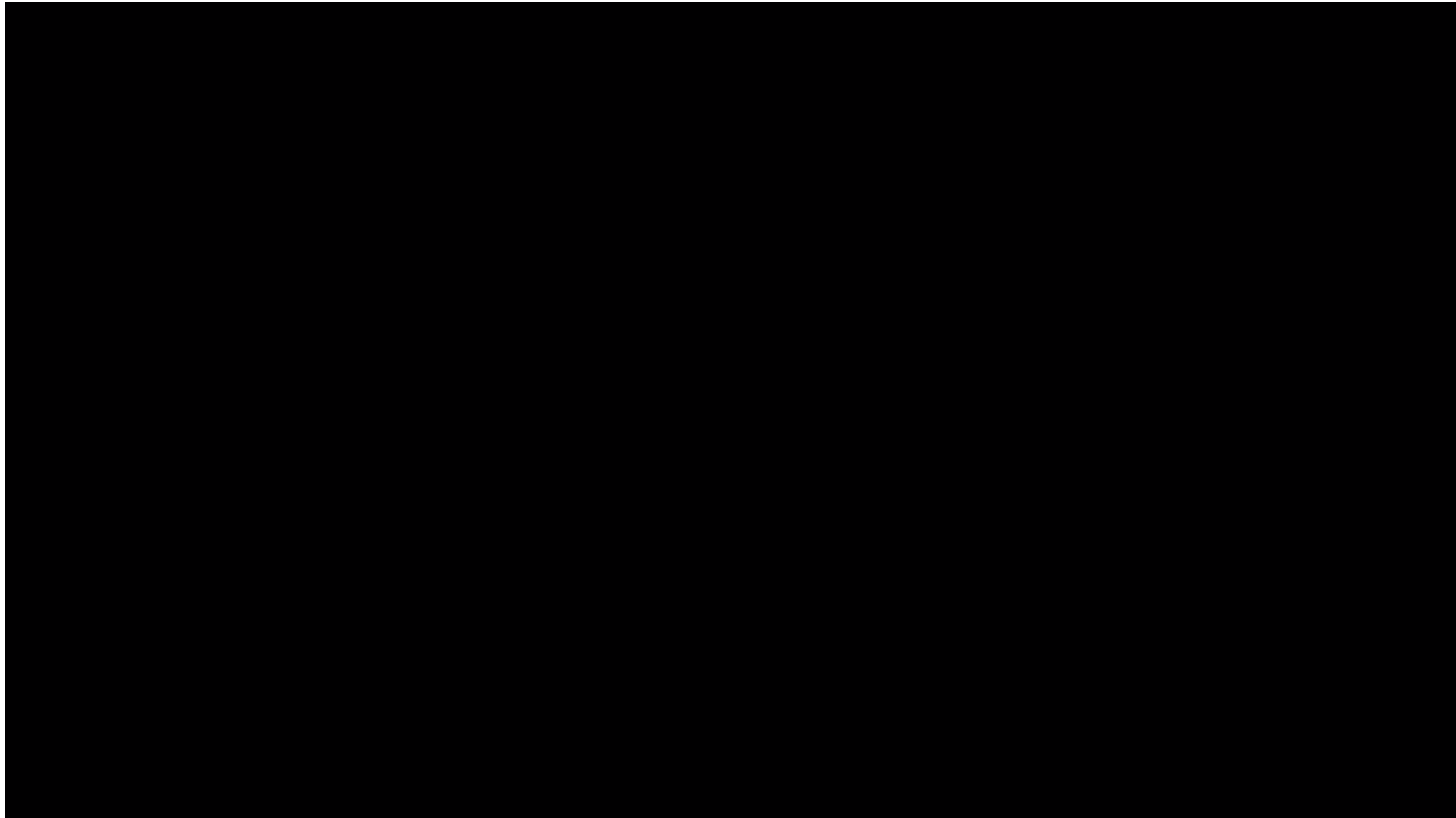
- **Duh –**
- **Voice Trigger Combined Commands**
  - “Hey Ford sync, I’m cold”
  - “Hey Toyota, navigate to nearest gas station”
- **Phrase Spotting Controlled by Situation**



“Call from Todd Mozer, answer or ignore?”

“Answer” – we are connected, **eyes** and **hands** free

# Driving



# Kitchen and Home

- **Hands Busy/Messy**

- “How many cups in a pint?”
- “Find a veggie soup recipe”



- **Control of Phone/Tablet**

- “answer” rather than picking up your phone
- “snooze alarm”
- “Hey smart phone, set timer for ten minutes”

- **Home Control**

- Thermostats, clocks, lights shades, security systems, etc.

“Hello Thermostat.  
Make it warmer.”



- **WELL Proven in Market**
- **Environments**
  - Home
  - Car
  - Outside
    - Truly hands free **MUST** work well in all of these environments
- **The Key**
  - Finding the perfect match between false accepts and false reject

# Wearables

- **Hands Free – Powerful Feature**

- Small products
- Limited buttons/screens
- Complicated user interface without voice control

- **Possible Commands**

- “Contacts”
- “Check my schedule”
- “Weather”

- **Low Power is Key**

- Always on trigger verses event trigger





# Cameras

- **New Category**
  - Personal action cameras
  - GoPro nailed it, now MANY are following
- **Voice Trigger**
  - Turning on/off camera
  - Taking pictures
  - Turning Wifi on/off
  - Selecting mode
  - Turning on/off video record



This is how all my recordings start

# Truly Hands Free Benefits

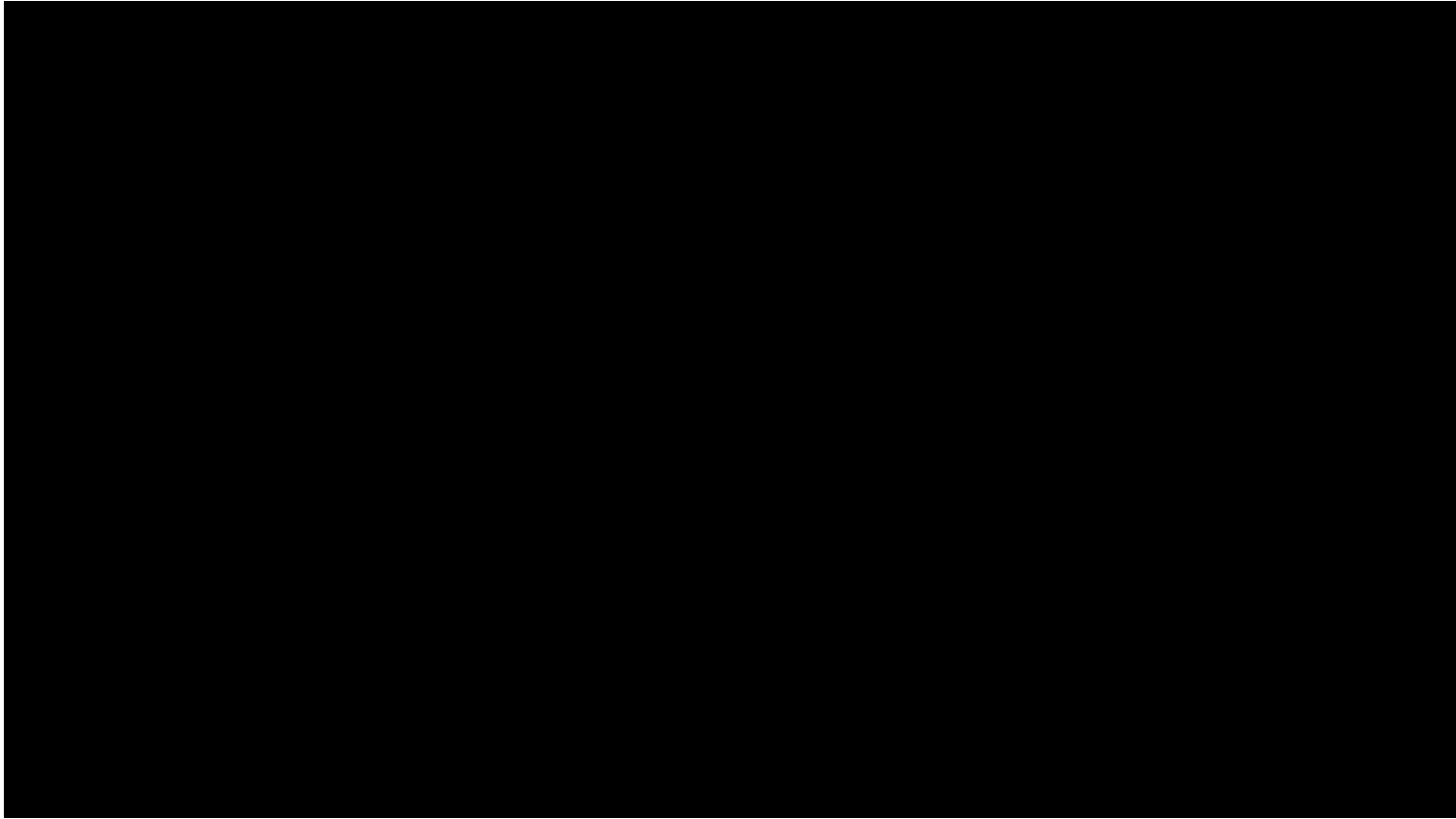
- **Ease of Use**
- **Convenience**
- **Product Differentiation**



# Ease of Use

- **No** need to pull out the phone every time you need something
- **No** need to look at a display
- **No** need to find and press buttons
- **No** need to walk over and pickup or touch the product
- **Allow** user to jump from application to application by voice
- **Allow** user most natural interface!

# Convenience



**Hands Free**

# Product Differentiation

- **Automotive**
  - Hands and eyes free – this is important with all other distractions
  - Great opportunity for low and mid-end radios
    - Add basic answer/ignore
- **Kitchen and Home**
  - A microwave is a box with a door and buttons, voice control is a powerful new feature
- **Mobile**
  - Many phones now look and act the same
    - Voice triggers and commands make the difference
- **Wearables**
  - New market, but quickly will be saturated
- **Cameras**
  - Lots of competition coming, voice will greatly help differentiate

# Key Requirements

## Voice Trigger **MUST** Have and Be:

**Very Low Equal  
Error Rate**

**Ultra Small  
Footprint**  
-Less MIPS  
- Less Memory

**100%  
Embedded**

**No Cloud  
Connection  
Required**

**Noise Robust**

# Truly Hands Free – Lowest Power is Key

- **Users Don't Want to Manage**
- **Running at the DSP/Codec provides an ALWAYS on, ALWAYS listening feature**
  - Sensory has ported to 11 DSP/Codecs
  - Running less than 2mA's
    - If the phone was not used at all, this translates into a 20 minute reduction in battery life.
    - With normal phone usage, the user would not see a difference!



# Truly Hands Free - Today

- **Trigger to Search**
  - TrulyHandsfree voice trigger removed the requirement to push a button
  - Next step was to remove the need for the user to look at the device and wait for response
  - Trigger to search provides the MOST natural user interface available
  - The Result:
    - “Hello BlueGenie navigate to the home depot in Santa Clara California”



# ***Truly Hands Free - Today***



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- **User Defined Passphrase**
  - MANY users DON'T lock their smart phones....why?
    - Hassle!
    - Unsafe while driving
  - Most natural means of security
    - Fast and accurate
    - Hands Free
    - Ease of use
  - Quick enrolment
  - Accurate: **MUST** be accurate in quiet and noise!

# Truly Hands Free - Today

- **Speaker Identification**

- Ideal for shared devices such as smart phone/tablets/TV's/Auto's, etc.
- One simple step (trigger and ID) with one phrase
  - Most natural
  - GREAT for home screen settings
    - Show only those applications that are used by the user, not that the kids use
  - GREAT for favorite URL's, etc.



# Truly Hands Free – Today

- **Phrase Spotting**
  - Ability to Deal with “Real” users Speech
    - Umms and other sounds before the speech
    - Stutters
  - Words spoken before and or after the target commands/phrases
  - Real environments
    - Home (with others talking, TV on, etc.)
    - Automotive
    - Outside

# Truly Hands Free – Tomorrow

- **Combine already widely accepted and accurate voice trigger with:**
  - Vision
    - Take the best of both technologies
  - Gestures – some actions are easier with voice, others with a gesture
    - Controlling volume for example
  - Proximity
    - Improve FA's by only listening when needed
  - Thought
    - Not there yet...



# *Thanks!*



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