



SCBA Augmented Reality

August 5, 2019

Overview

- Augmented Reality (AR) has made its way to fire services Self Contained Breathing Apparatus (SCBA).
- Improved Situation Awareness can be shared to and from multiple users in real time (streaming video and data).
- Rivada Research has some unique IPR.

- **US9744384 SCBA Display**

This patent family pertains to augmented reality for enhancing the situation awareness of the users. As part of the display method an electrowetting lens is also introduced with the augmented reality for near and far field focusing eliminating the need for specialized glasses or potentially binoculars when wearing it.

- **US9209888 Video and Data Relay**

The Video and Data Relay family of patents cover both relaying video and data. The Video and Data relay patents address the ability of a wireless device to become a hot spot for other wireless devices. Video and Data is relayed from device to device as part of a mesh network.

Overview

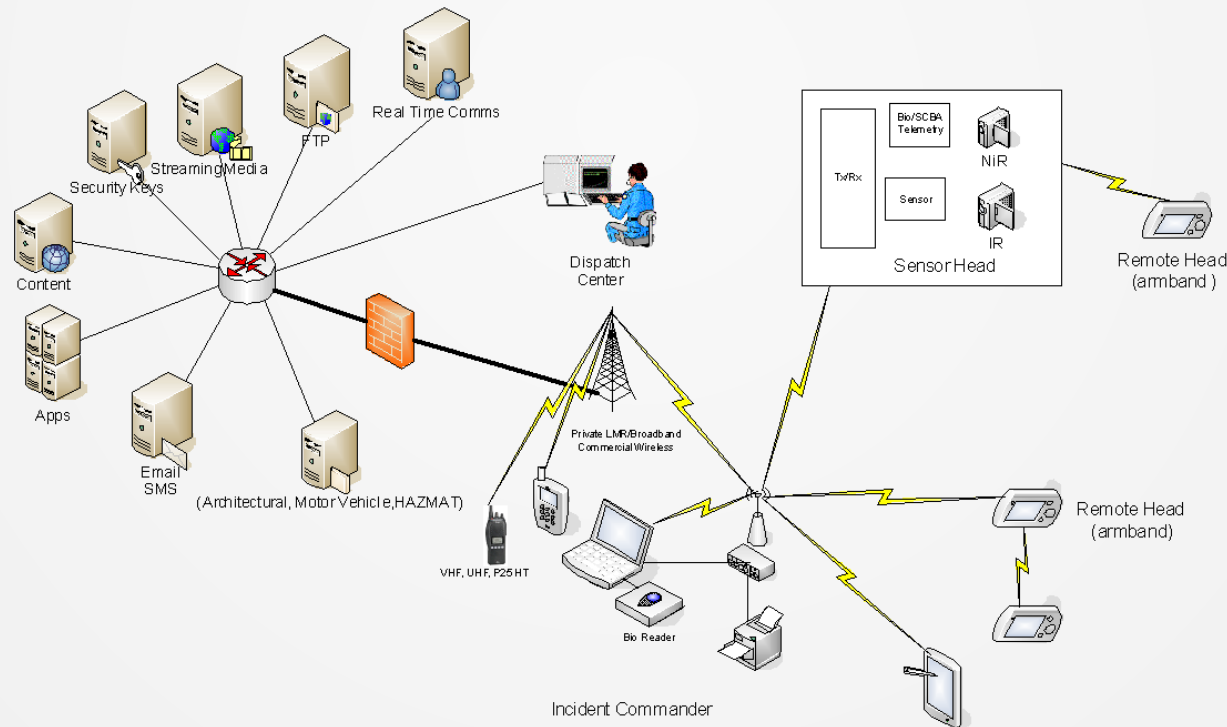
- Situation awareness is critical for any incident response.
- LTE is the First Responder wireless communication protocol endorsed by FirstNet and APCO.
- Improved situation awareness is achievable through the use of LTE (band 14) either as a wide area or local network.
- Led display (HUD) as well as PASS alarms are common to SCBA equipment.
- Infrared cameras for the fire service have and are being used for search/rescue as well as fire detection.

Overview

- However the situation awareness information remains local to the individual fire personnel.
- Presently the ability to share situation awareness information or obtain information from other data sources at the incident needs improvement.
- SCBA equipment is very effective and saves lives however with the introduction of broadband services to the fire service (LTE) many advances to situation awareness both with the incident commander, interior and fire ground is now possible.
- Broadband communications through the use of LTE is going to transform how information is used at an incident.

First Responder Integrated Communication System

- Situation Awareness involves obtaining information relevant to the situation.
- There are many sources of information which are needed which include tactical and sensors.



Overview

The SCBA mask coupled with augmented reality (AR) can improve situation awareness.

The flexible display (FOLED) can be incorporated into the SCBA mask.

The ability to change the information content being displayed improves the situational awareness as well as the effectiveness.

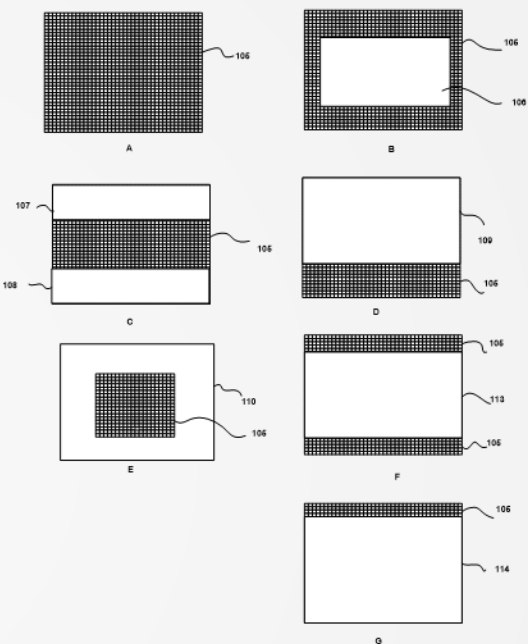
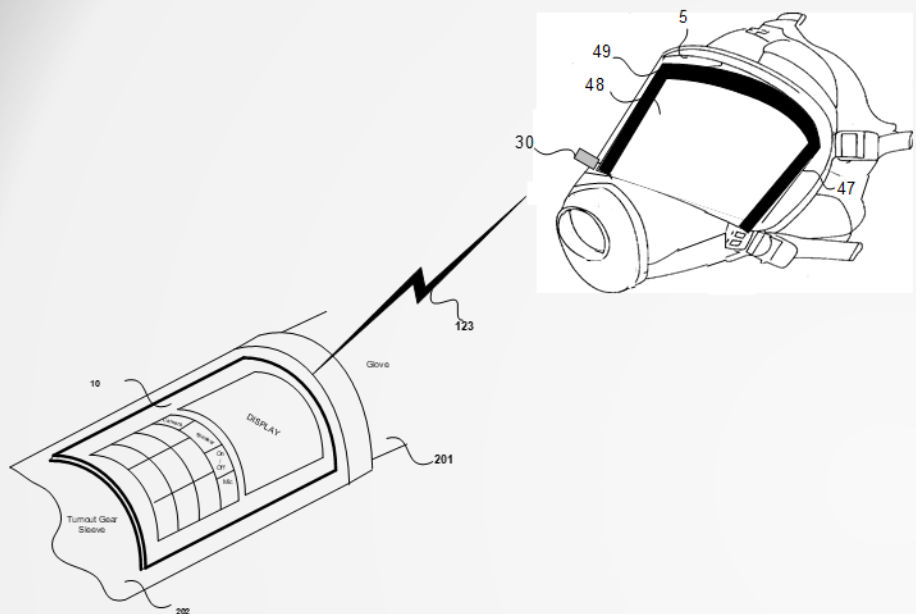
Situation awareness improvement can be achieved by not only having information content displayed while at the same time reducing the amount of items the firefighter has to carry.

Information can also be shared between the Incident commander and the other first responders.

Tactical data like building schematics for the relative floor or vehicle information as to airbag locations can be pushed to the team.

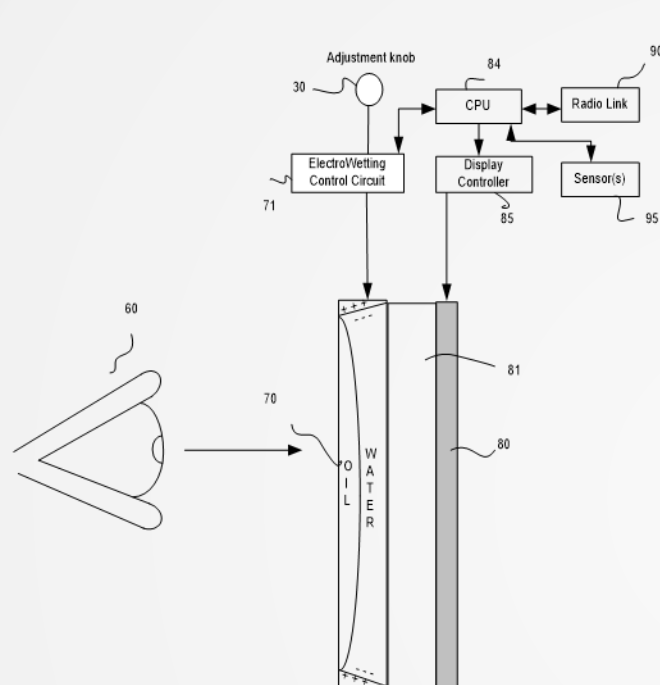
The introduction of a flexible display coupled with an infrared camera and other capabilities is now possible.

Augmented Reality for SCBA

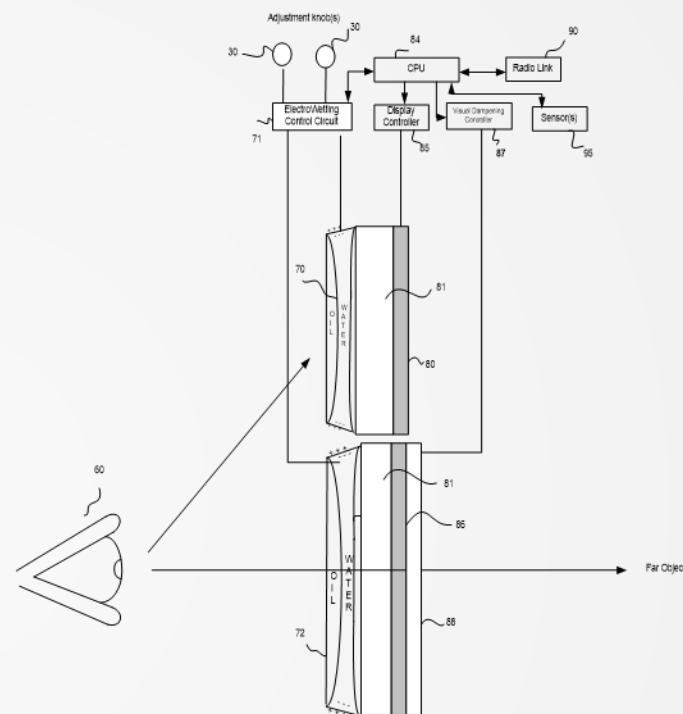


- SCBA connected to controller and either integrated in PPE or attached via Velcro.
- Different Display Configurations depending requirements and application.

SCBA Lenses



- **Single Electrowetting Device**



- **Dual Electrowetting units**
 - Near display
 - Distance

SCBA AR Mounting and Control

- **AR Camera and Sensor mounted**
 - on Helmet
 - on SCBA
 - Integrated into SCBA
- **AR Display controlled by wrist device or knob**

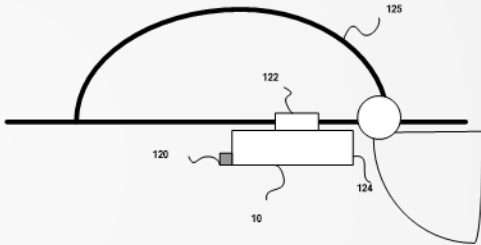
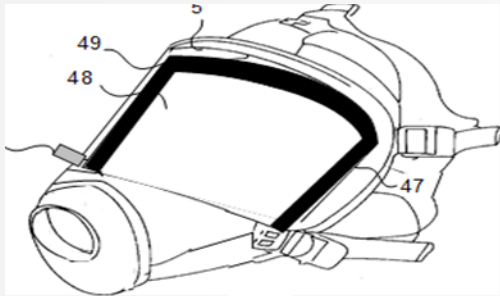


Fig 2

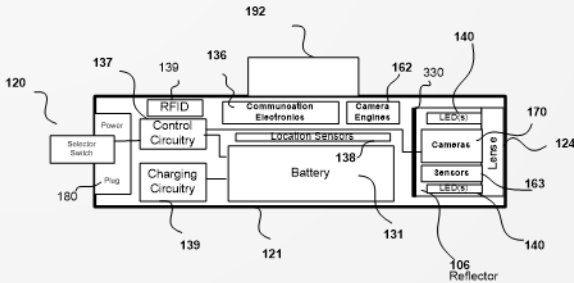
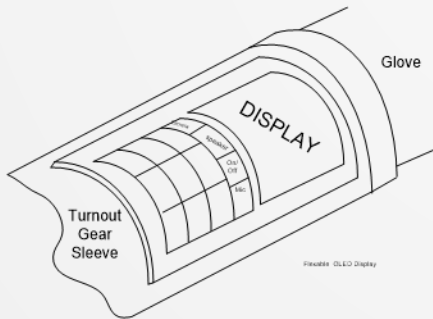
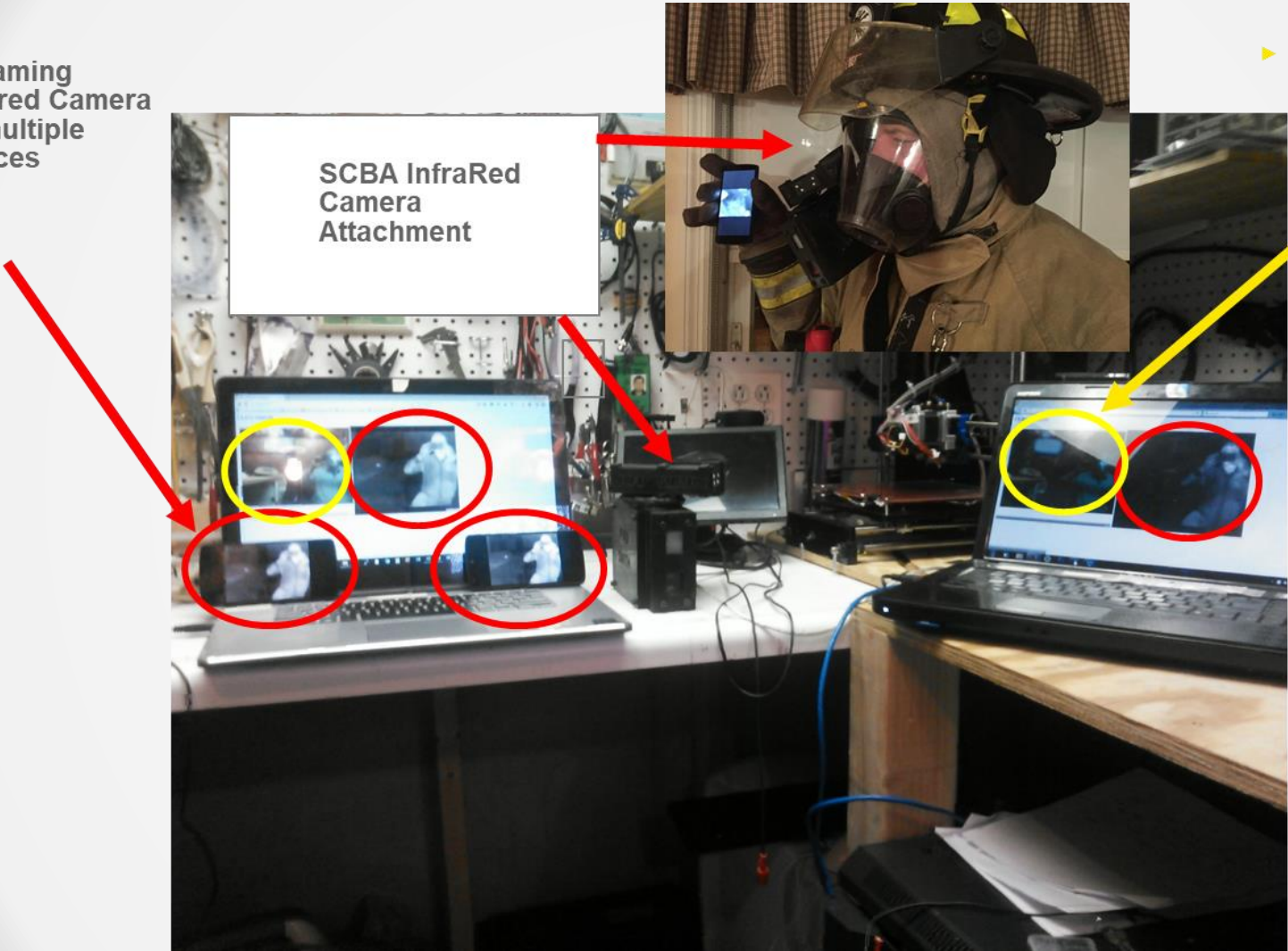


FIG 5

SCBA Augmented Reality POC Sending Multiple Video Streams (Currently in Service)

▶ Streaming Infrared Camera on multiple devices



The Augmented Reality for SCBA and other concepts are covered under the following patents that have been granted both domestic US and international. Other patent applications have been filed as well.

8,068,808	9,203,714	2014274260	ZL 201480009912.3	2571825
8,086,280	9224169	2014274397	9224169	9,232,354
8,280,344	9,226,193	2014274294	201480030073.3	9,258,675
8,275,349	330478	2014274265	6147413	5856675
8,279,786	2015202708	9.467.843	348065	9332386
8,611,848	9,225,498	9,532,229	2016-501979	9,351,112
8,670,403	9,258,687	24317	15/266,822	9,344,848
8,711,721	9,338,704	6063864	2014274399	9,338,608
8,717,929	9,357,469	9,629,020	201480030339.4	9,485,623
8,837,418	2015202709	2016203689	15/086,614	9,525,438
8,892,066	9426727	ZL 201480030537.0	2015-560370	9,538,498
8,934,439	340327	MX/a/2013/000570	15/449,819	9,538,499
8,934,373	2,874,769	MX/a/2015/010738	2014274379	9,609,616
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325864	9462574	ZL 201480011741.8	2012296566	9,641,978
2013/01213	2014223173	ZL 201480015042	1469429	15/131,124
2014101509	2014248719	2014274387	2,843,913	ZL 201280050710.4
9,088,989	2014244046	MX/a/2015011312	9,173,065	14/740,520
9,094,899	2014244093	MX/a/2015/012479	9,253,602	13/668,511
9,094,958	9,479,941	ZL 201480015500	9,209,888	
2015202708	2014274260	ZL 201480009912.3	331728	

NGC is a consulting team of highly skilled and experienced professionals. Our background is in wireless communications for both the commercial and public safety sectors. The team has led deployment and operations spanning decades in the wireless technology. We have designed software and hardware for both network infrastructure and edge devices from concept to POC/FOA.

Our current areas of focus include 4G/5G. IoT and security.

The team has collectively been granted over 160 patents in the wireless communication space during their careers. We have also written multiple books used extensively in the industry on wireless technology and published by McGraw-Hill.

Feel free to utilize this information in this presentation with the simple request you reference its origin.

If you see something that should be added, changed or simply want to talk about your potential needs please contact us at

info@nextgconnect.com or call us at 1.845.987.1787

Thank you