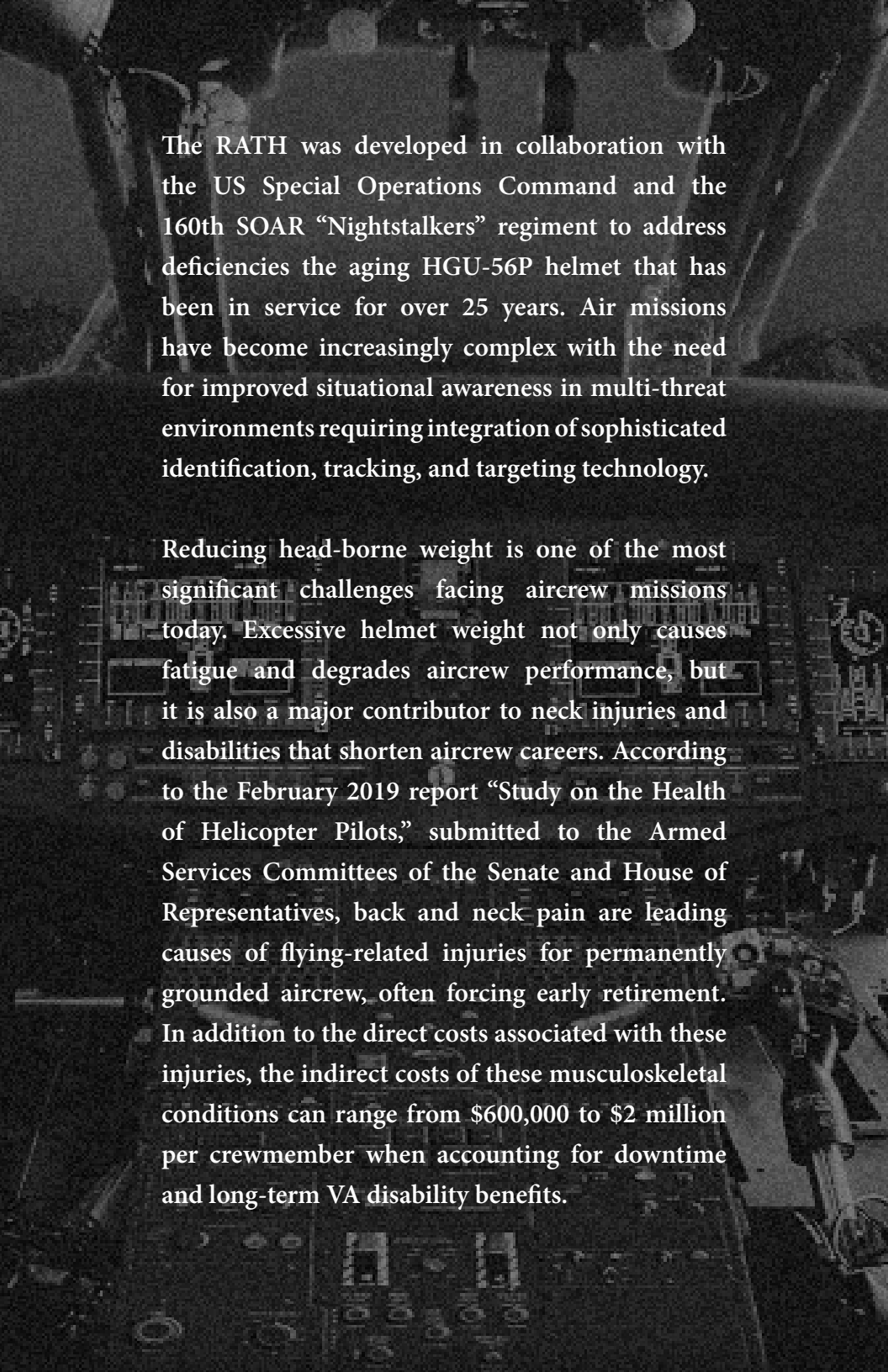




Rotarywing Advanced Tactical Helmet

OPERATIONS MANUAL



The RATH was developed in collaboration with the US Special Operations Command and the 160th SOAR “Nightstalkers” regiment to address deficiencies the aging HGU-56P helmet that has been in service for over 25 years. Air missions have become increasingly complex with the need for improved situational awareness in multi-threat environments requiring integration of sophisticated identification, tracking, and targeting technology.

Reducing head-borne weight is one of the most significant challenges facing aircrew missions today. Excessive helmet weight not only causes fatigue and degrades aircrew performance, but it is also a major contributor to neck injuries and disabilities that shorten aircrew careers. According to the February 2019 report “Study on the Health of Helicopter Pilots,” submitted to the Armed Services Committees of the Senate and House of Representatives, back and neck pain are leading causes of flying-related injuries for permanently grounded aircrew, often forcing early retirement. In addition to the direct costs associated with these injuries, the indirect costs of these musculoskeletal conditions can range from \$600,000 to \$2 million per crewmember when accounting for downtime and long-term VA disability benefits.

TABLE OF CONTENTS

Safety & Theory of Operations	1-2
Components	3-4
Sizing	5-6
Helmet Fitting	7-8
Chinstrap	9
Liner Comfort Pads	10
Visor	11-12
Headset	13-14
Night Vision Equipment	15-16

SAFETY & CERTIFICATION

The RATH has undergone first article and continued lot acceptance testing performed by USSOCOM at certified laboratories to meet & exceed the FNS/PD 96-18 Aircrew Integrated Helmet System (AIHS) performance specification. This is the most stringent aircrew helmet standard in the world and currently only the HGU-56P and RATH meet these requirements.

Summary of performance required by FNS/PD 96-18

<u>Impact Protection</u>	(tested at -10 ° C, 21° C, 55° C)
Crown region	head deceleration < 150 Gs at 4.88 m/s velocity
Headband region	head deceleration < 175 Gs at 6.0 m/s velocity
Earcup region	head deceleration < 150 Gs at 6.0 m/s velocity

Shell Penetration Resistance < 5 cm tear from 5.0 kg impactor at 5.5 m/s

Acoustic Attenuation ANSI S12.6

	Frequency (Hz)								
	125	1250	500	1000	2000	3150	4000	6300	8000
Mean	29.1	26	33	30.6	40.1	50.2	55.6	54.1	53.5
SD	6.26	.6	6.43	.9	3.94	.4	6.75	.7	5.7

Speech Intelligibility > 75% (T) and 90% (O) with (MRT) in ANSI S3.2

Chinstrap Retention Strength ANSI z90.1
< 3.8 cm elongation or slippage when subjected to 1950 Newton tension

Visor Ballistic Impact MIL-PRF-32432 Class 1 projectile @ 200 m/s

Visor Non-Ballistic Impact ANSI z87.1-2010
Drop Ball, High Mass Impact, Penetration & High Velocity Impact

Visor Optics MIL-DTL-43511D
Sections 3.5.1 to 3.5.3 & 3.5.5 to 3.5.9 including Prismatic Deviation, Refractive Power, Luminous Transmission, Optical Distortion, Haze, UV

Visor Mechanical & Environmental MIL-DTL-43511D
Sections 3.5.11 through 3.5.15, including Abrasion, Bayer Abrasion, Coating Adhesion, Weathering Resistance, and Chemical Resistance

THEORY OF OPERATIONS

Due to varying mission requirements and aircrew duty positions, the RATH was developed to be modular and configurable by aircrew personnel without needing specialized (ALSE) technical support.

Different capabilities can be customized by using various accessories and versions of components, all specifically designed for system level compatibility. Advancements in technology like photochromic visors and hearing pass-through communications have improved helmet functionality while reducing weight, while accessories like the ballistic applique and maxillofacial mandible provide increased protection.



Examples of helmet & accessory configurations used by duty position

Pilot / Co-pilot: ANVIS Mount, Photochromic Visor, PHODs, IR light

Crew Chief: Hearing Pass-thru, IR Lights, Maxillofacial Mandible

Rear Chief: Tinted Visor with Boogie Goggles, RGB Lights

HHO: Maxillofacial Mandible, RGB Lights, Environmental Cover

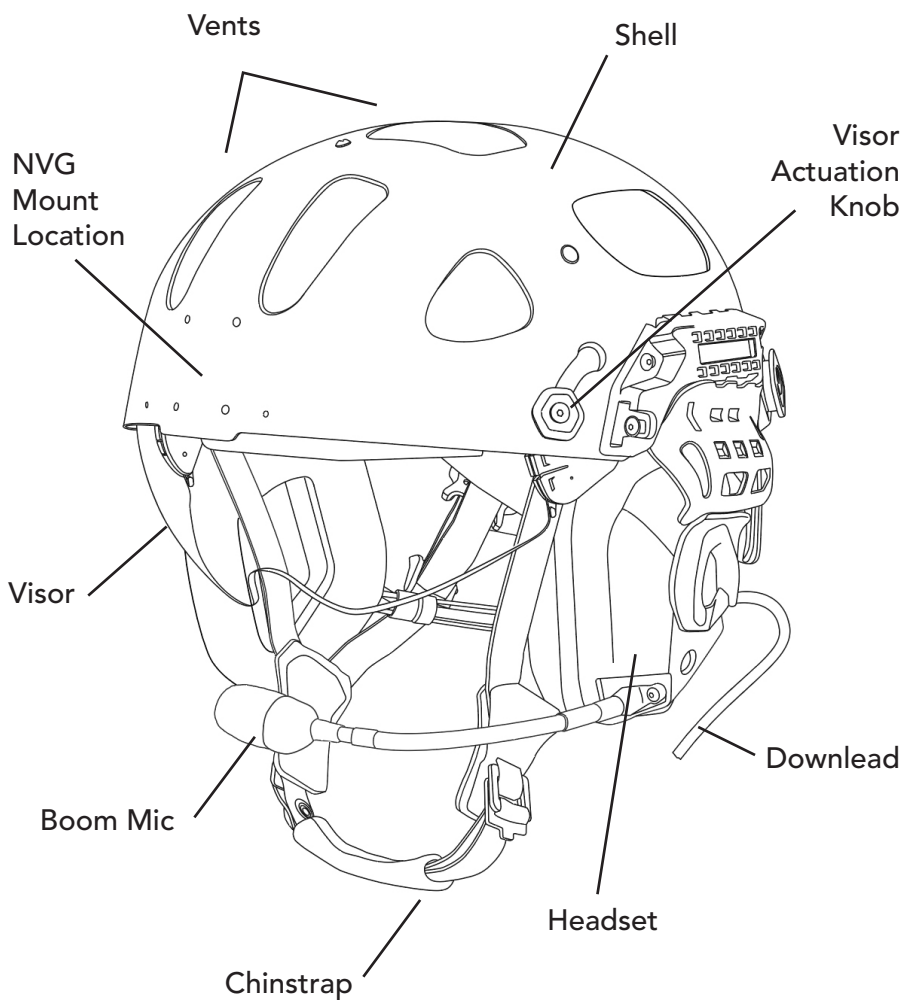
SAR / Medic: Headset Arms, RGB Lights, IFF Strobe, Ballistic Applique

- helmet on impact testing machine -

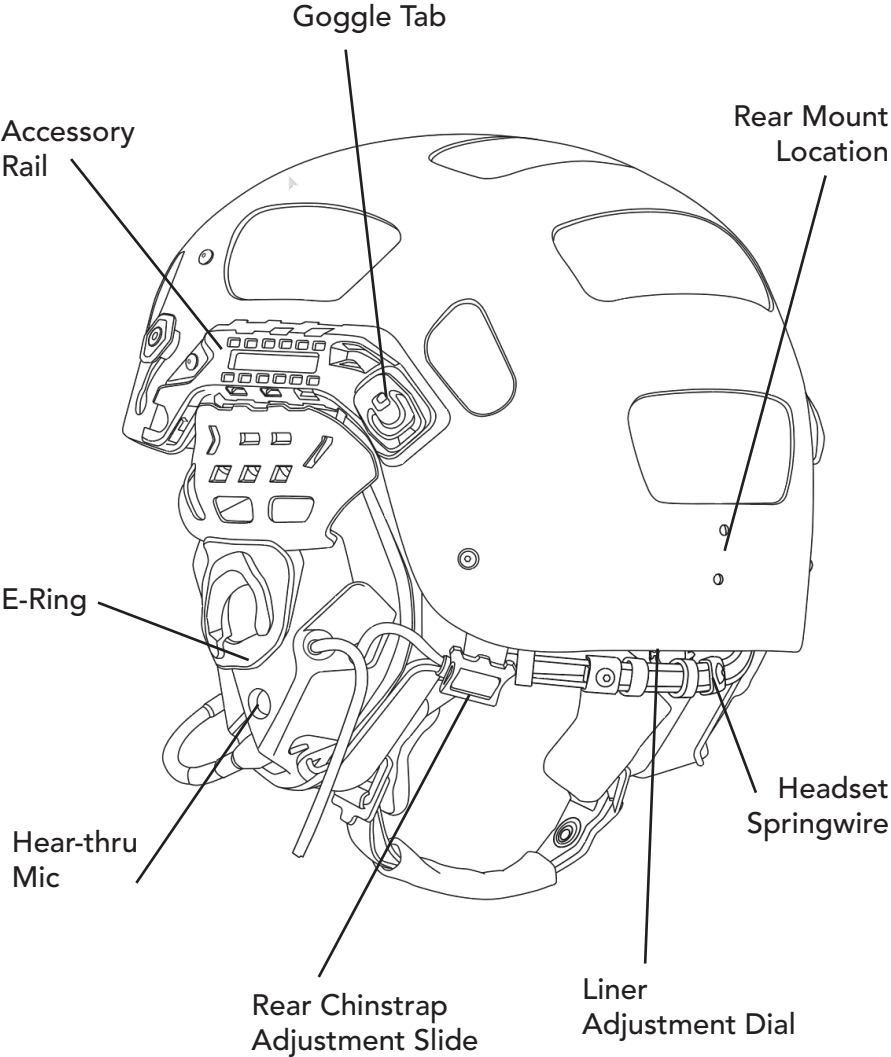


- headset with headstrap -

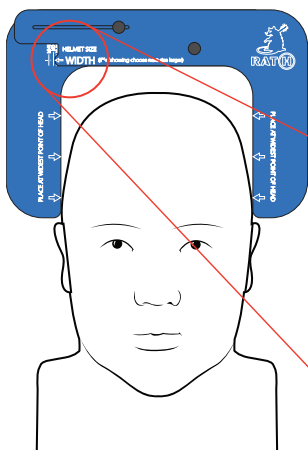
COMPONENTS



COMPONENTS

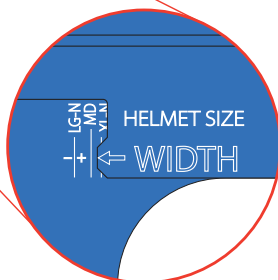


SIZING USING CALIPER

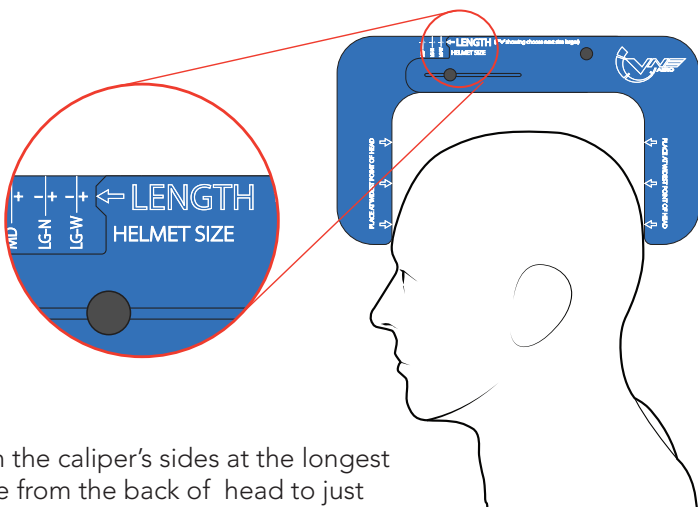


Use the sizing caliper to take head width and length measurements as shown.

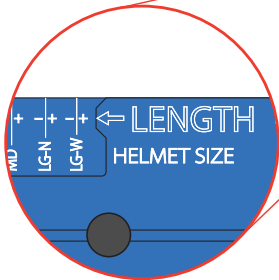
- Width is measured on one side of caliper
- Length is measured on the other side



Position the caliper at the widest distance above the ears



Position the caliper's sides at the longest distance from the back of head to just above the eyebrow on the forehead

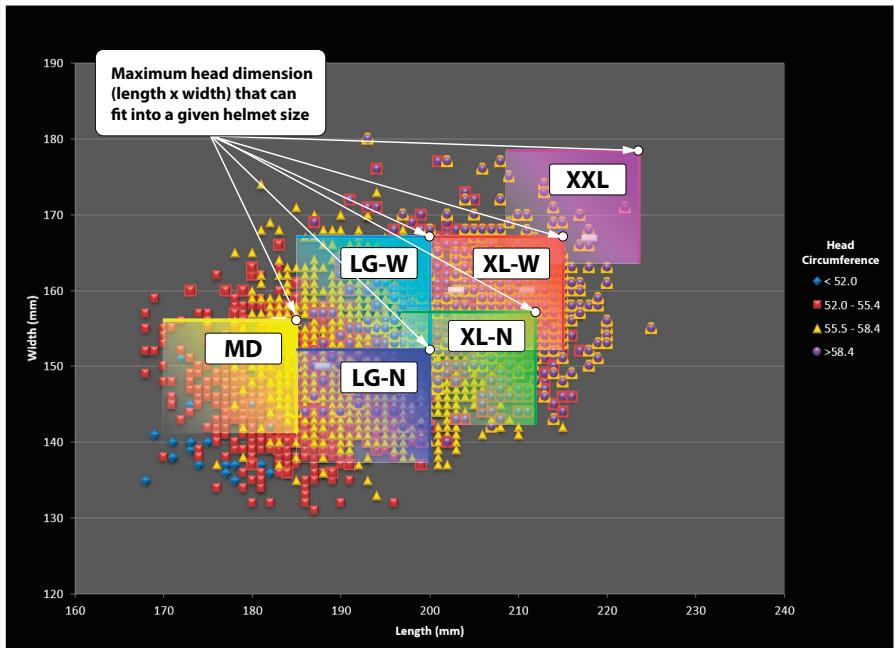


The correct helmet size is the one that is greater than the marking shown

* If one measurement (Length or Width) recommends a different size than the other, choose the larger helmet size of the two measurements

SIZING USING MEASUREMENTS

RATH Size	Head Length (maximum)		Head Width (maximum)		Head Circumference		Equivalent HGU-56P	Equivalent SPH-5 Size
	(mm)	(inches)	(mm)	(inches)	(mm)	(inches)		
minimum	178	7.01	140	5.51	532	20.94		
MD	187	7.36	156	6.14	551	21.69	X - SMALL	SMALL
LG-N	202	7.95	152	5.98	570	22.44	SMALL	REGULAR
LG-W	202	7.95	167	6.57	593	23.35	MEDIUM	
XL-N	212	8.35	158	6.22	596	23.46	LARGE	X-LARGE
XL-W	217	8.54	170	6.69	623	24.53	X-LARGE	
XXL	225	8.86	180	7.09	651	25.63		XX-LARGE

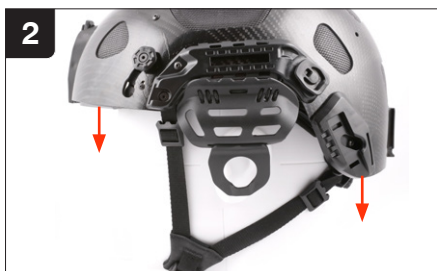


HELMET FITTING - DIAL



The tightness of the helmet liner can be adjusted using the rotary dial on the back located below the edge of the shell

Turn the dial clockwise to tighten and counter clockwise to loosen



Helmets ship from the factory set with the liner adjusted for average head shapes

People with taller heads sometimes prefer to set the rotary dial lower on the back of the skull while making the overall liner deeper



To adjust the height of the liner and rotary dial relative to the helmet shell, loosen two screws on the rear of the shell (do not remove screws)

Slide the liner up and down vertically to set the desired height



Once the liner and rotary dial are positioned comfortably, re-tighten the two screws on the rear of the shell to lock the liner back in place

HELMET FITTING - CROWN



Adjust the fit of the helmet without the headset attached.

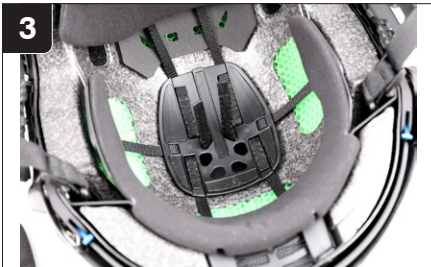
Put the helmet on to evaluate the fit

If it is tight or creates pressure points it is too small for you. Return or swap out for a larger size



The helmet should fit comfortably and be slightly loose prior to tightening the internal liner

The depth and angle the helmet sits on the head can be adjusted by tightening the straps under the crown comfort pad



To adjust, remove the crown comfort pad by peeling it away from Velcro

Peel back the webbing pieces which are also attached with Velcro

Slide the webbing pieces longer or shorter and then re-attach to Velcro



Re-attach the crown comfort pad and put the helmet back on to evaluate the fit.

The front of the helmet liner should rest just above the bony ridge of the eyebrow and not on eyebrow.

CHINSTRAP ADJUSTMENT

1



Helmets are available with one of (3) different versions of chinstraps

1. Double D-Ring = 200 kg. pull
2. Fidlock 25 mm = 200 kg. pull
3. Fidlock 16mm = 80 kg. pull

Adjust when wearing helmet

2



Adjust the rear chinstraps forward - aft by pulling the plastic "Crownloc" slider toward or away from the chin

The Crownloc slider works best when gripping with thumb and middle finger on sides and forefinger on the top

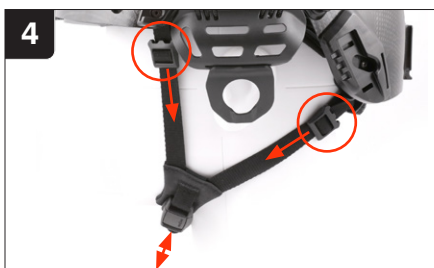
3



Adjust the bottom chinstrap tightness by pulling the webbing through the metal loop and tucking back underneath the fabric sleeve

Repeat the process for both sides of the chinstrap. This can also be done simultaneously with both hands

4



The chinstrap with 16mm Fidlock buckle also has front straps that can be adjusted in a similar fashion

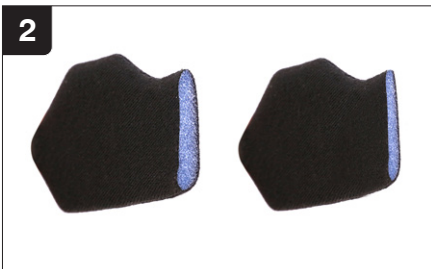
Note: The length / height of the front chinstrap on the D-Ring and Fidlock 25mm versions can also be adjusted by a qualified ALSE tech

LINER COMFORT PADS



Soft moisture-wicking comfort pads are attached to the internal Skullplate helmet liner velcro hook

Note: Only one side of the comfort pad material is velcro compatible. If it doesn't stick then flip it over



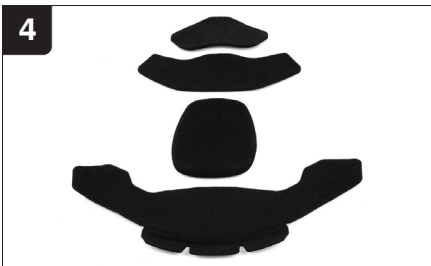
All helmets ship from the factory with 6mm thick comfort pads

3mm thick comfort pads are also available as part of the Custom Liner Fitting Kit for those wanting a thinner pad in some liner locations



Comfort Pads can be washed with mild soap and water inside or removed from the helmet

* Remove the headset before washing the helmet since the headset is not waterproof and could be damaged by getting water inside



After washing the Comfort Pads let air dry or user dryer on low temperature setting.

Install new Comfort Pads into helmet if they become worn or smelly or after (200) hours of use or (2) years in active service

VISOR HEIGHT ADJUSTMENT



To deploy or retract the visor, pull out on the visor knob using thumb and fingers to rotate up or down

The knob will spring back into place locking the visor in the stowed or deployed position



Helmets are shipped from the factory with a protective film cover around the visor

To remove the protective film, deploy the visor to the "down" position and then cut the bottom edge of the film with scissors



Helmets are shipped from the factory with the visor vertical travel set to deploy to the lowest position. On some users this allows the visor to pivot too far and hit the nose.

To set the visor height, rotate the visor down to the deployed position



Loosen the small torx screw 1/4 turn located behind the visor knob

** do not remove the screw **

Push the visor up to the desired position. The screw and retaining hook will move inside the slot in the shell. Re-tighten the screw to lock

VISOR REMOVAL



Pull on the visor knob and pivot the visor down to the deployed position

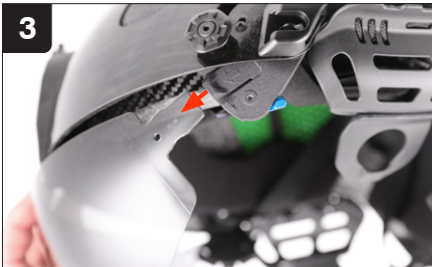
Rotate the blue lever on the bottom of the visor carrier rearward until it stops to unlock

Unlock the blue levers on both sides



Place forefinger below the safety latch on the visor carrier and gently pry up approximately 1/8" while at the same time pulling on the visor away from the helmet. Do not force

If it does not release, double check the blue lever is all the way back



As the visor releases from the carrier, it will run into the front edge of the helmet shell.

Gently wiggle the visor down past the front edge of the helmet until it is clear below the helmet



Once the visor is released on the side of the knob, pivot the visor down lower to provide easier access to the carrier on the other side

Repeat the same process of prying up the safety latch on the visor carrier while pulling the visor out.

HEADSET FITTING

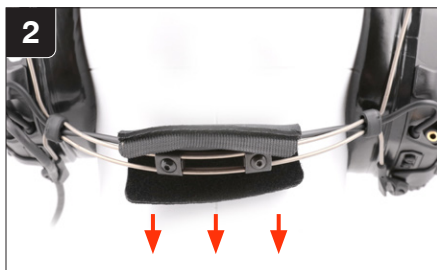
1



First-time headset fitting should be done with headset separate from the helmet

The headset should be worn as shown with approximately 1/2" of space between the rear nape pad and the neck of the user

2



The circumference of the headset springwire band is adjustable for those who do not have a 1/2" of space between the band and neck

Remove the headset comfort pad sleeve by peeling apart the two halves attached by Velcro

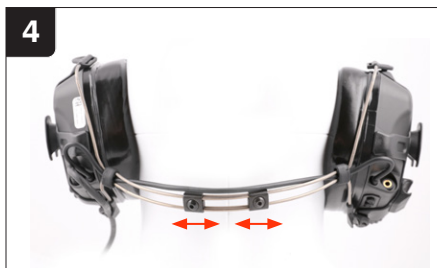
3



Loosen the two screws 1/4 turn in the headset springwire band

*do not remove the screws *

4



Slide the screw brackets closer or farther apart to change the headset band circumference

Tighten the screws when finished to lock in place

Re-attach the comfort pad sleeve

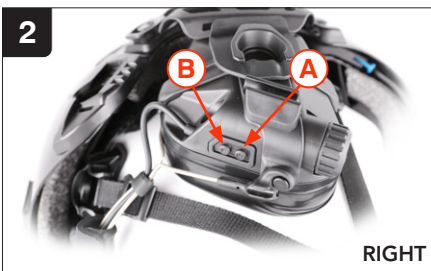
HEADSET FUNCTIONS



The headset uses an A123 3-volt battery to power the "Hear-thru" and Active Noise Reduction (ANR)

Install the batter with positive "+" facing the cap.

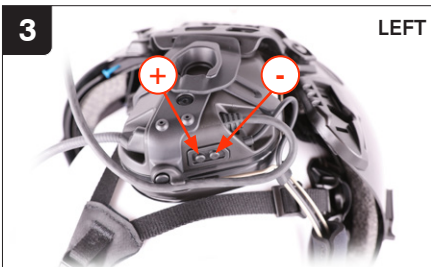
Screw on cap snugly against O-ring



To power on the Hear-thru function (A) push the front button one press

To power on the ANR function (B) push the rear button one press

One "beep" the function is ON
Two "beeps" the function is OFF



Press the "+" button with a long hold to increase the volume of the Hear-thru and the "-" button with a long hold to decrease the volume

This will adjust the volume in the headset and when worn with CEPS



CEPS (earbuds) can be worn in conjunction with the headset to provide a higher level of sound attenuation and hearing protection

CEPS and PACE hearing protection brands are available with RATH compatible 3.5mm audio jacks

NVG MOUNTING



Attach ANVIS style night vision mounts to helmet using the quick-release (QR) shim plate

Insert the screw posts on back of the ANVIS mount into the keyhole shapes on the front plate and push down to lock



To release ANVIS mount, push down on the plastic plunger on top of the QR shim while simultaneously pushing up on the ANVIS mount

Pressing the plunger will allow the screw posts in ANVIS mount slide up and out of the keyhole shapes



To permanently attach an ANVIS mount to the helmet, first follow Steps 1 and 2 above

Insert (2) locking screws into the two small holes in front of the plunger to prevent it from being depressed. (plunger lock screws sold separately)



Some brands of ANVIS screw posts are too long and create interference when used with the RATH

ANVIS screw posts that optimally fit the QR shim and RATH helmet are available for purchase and sold separately

NVG BATTERY MOUNTING

1



Velcro and Dovetail style ANVIS connectors are available to securely attach battery packs to the rear of the helmet

2



Single velcro mount shown

3



Cage mount with (3) separate velcro attachment locations for counterweight, NVG battery, and IFF strobe shown

4



Dovetail mount for NVG battery shown



VNE Aero

(subsidiary of Final Forge LLC)

100 Cargo Center Drive

CC-107

Blountville, TN 37617

423-574-2139

www.vne-aero.com