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CROWS

Stabilization and Accuracy for today's Warfighter

Bo Barbour

Kongsberg Protech Systems

WORLD CLASS – through people, technology and dedication

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-The history of KONGSBERG
-Background of the RWS
-Stabilization and Accuracy
-Key Performance Parameters
-The Future of RWS

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The History of Kongsberg

- The city of Kongsberg founded in 1624 by King Christian IV based on the discovery of silver in the area.
- The silver mine was the biggest industry in Norway and i constituted about 20 % of the income. In 1814 the Kongsberg weapons factory was founded.
- The Krag Jørgensen rifle was introduced in 1892, and became soon a big hit for the weapon factory. The US Army bought about 500 000 rifles, and it soon became one of the biggest export products for Norway.
- Kongsberg Weapons factory played a major role in post war recovery in Norway, after World War-2 renamed the Norwegian Defence Industry, and as we know it today, KONGSBERG.
- US manufacturing facility for CROWS II opened in 2008 in Johnstown PA, 90 % US parts.

First International Success

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Krag-Jørgensen

The **Krag-Jørgensen** is a repeating bolt action rifle designed by the Norwegians Ole Herman Johannes Krag and Erik Jørgensen in the late 19th century. It was adopted as a standard arm by Denmark, the United States and Norway.

The Krag-Jorgensen Rifle in Rimmed .30 Army round found use in the Boxer Rebellion, the Spanish-American War and the Philippine-American War. In this later war the rifle was referred to in a song popular with U.S. troops with a verse running:

Damn, damn, damn the Filipinos!
Cut throat murdering ladrones!
Underneath the starry flag,
Civilize them with a Krag,
And return us to our beloved home.

Why a Remote Weapon Station

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KPS- Kongsberg Protech Systems

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- **The Main Focus of Protech Systems:**
  - PROTECTOR Family of Remote Weapon Station (RWS)
  - Common Remotely Operated Weapons System (CROWS)
  - PROTECTOR Medium Caliber Remote Weapon Station (MC RWS)
  - M151 PROTECTOR
  - XM153 PROTECTOR CROWS
  - PROTECTOR Lite
  - PROTECTOR Super Lite

Vehicle Integrations

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RWS Family

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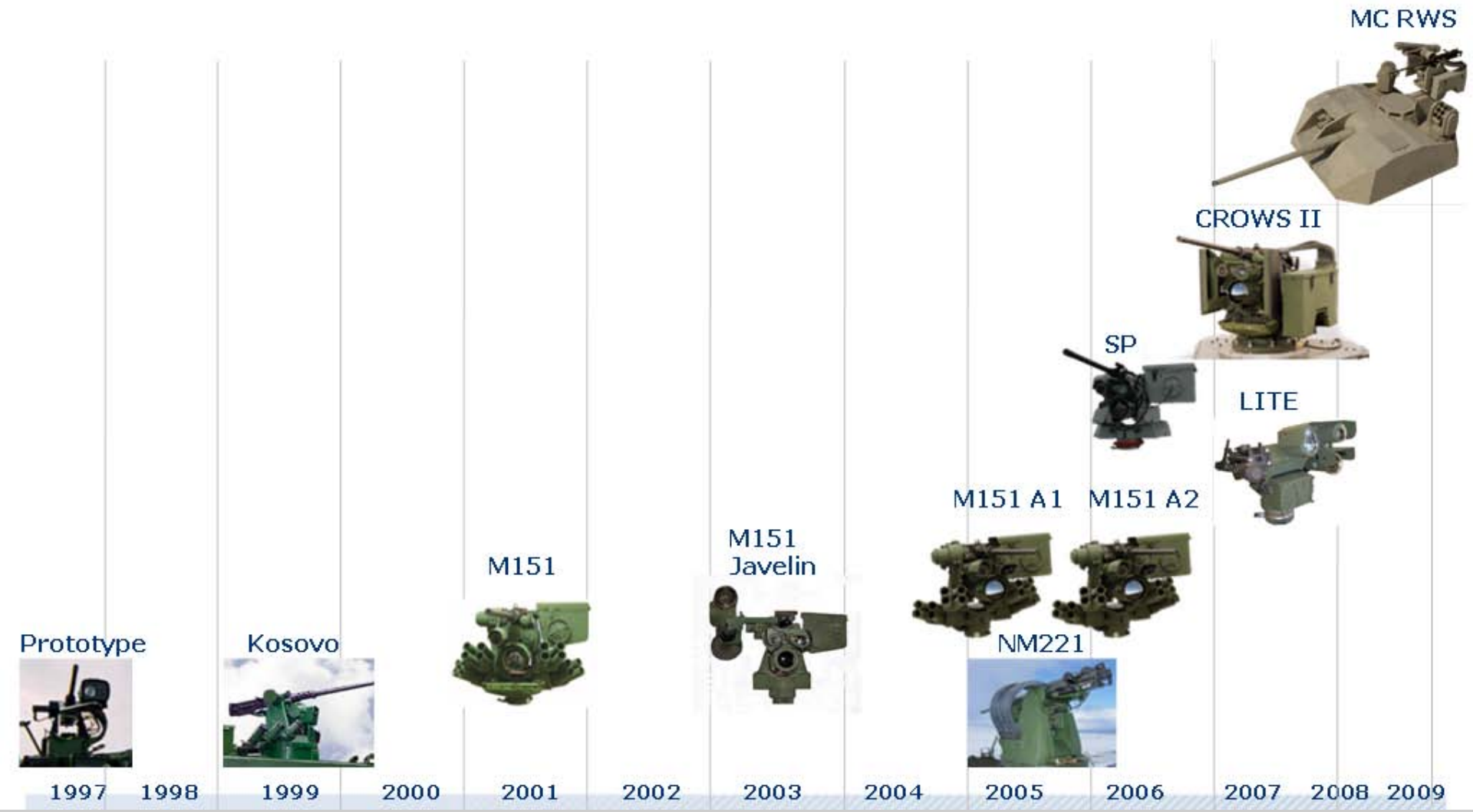

What is the Remote Weapon System (RWS)?

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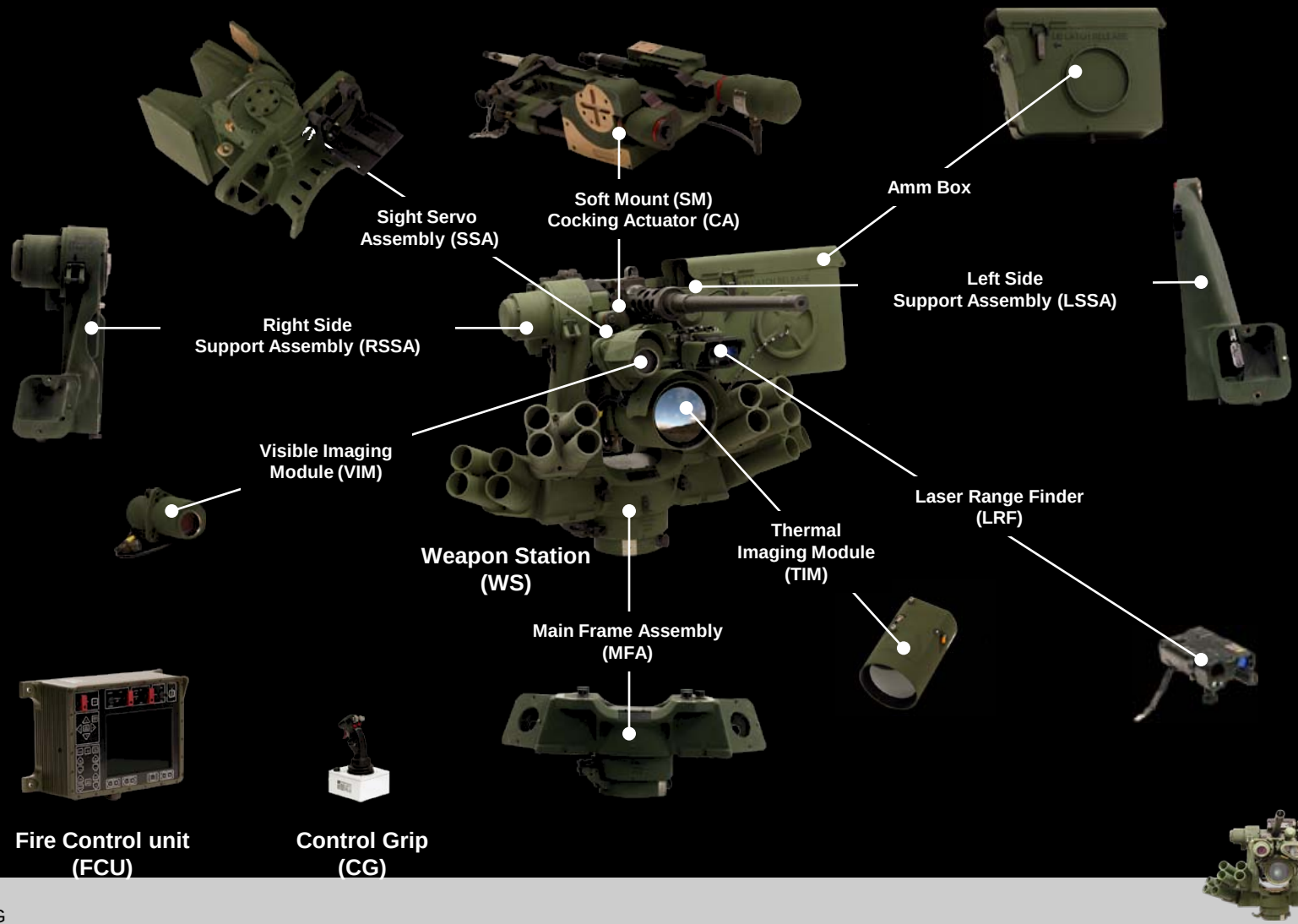
- The RWS is designed to be mounted on top on a variety of combat vehicles and is remotely operated by an operator located inside the vehicle compartment, giving complete armored protection from direct enemy fire.
- The remote operation of the RWS is carried out by two operating components,
  - **Fire Control Unit (FCU)**
  - **Control Grip (CG).**
- The system also has remote weapon charging capability for cocking of the weapon as well as firing.
- The tracking and control capabilities of the RWS provide a high first-round hit probability against stationary and moving targets.
- The RWS can also be operated manually if required.
- Integrated Machine Guns:
  - **MK-19 40mm**
  - **M-2 .50 Cal**
  - **M-240 7.62mm**
  - **M-249 5.56mm**

Main Parts

- RWS consists of following main parts:
- Weapon Station (WS)
- Fire Control Unit (FCU)
- Control Grip (CG)
- Connection Cables
- (**W1**) Power and signal cabel from FCU to CG
- (**W2**) Data signal cabel from FCU to WS
- (**W3**) Power and video cabel from FCU to WS

Line Replacement Units (LRU)



Principal Factors in Stabilization and Accuracy

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- Machine gun barrel condition – temperature and wear
- Soft recoil mount – attenuates recoil
- 4 axis servo system
- Stabilization on the move
- Lead angle compensation– determines lead on the move
- Fire Control unit – ballistic solution software
- Hand Control – man machine interface

Bore Sighting

- Bore sighting is the procedure of defining the position of the sight where the axis of bore and the line of sight are perfectly aligned.
- This position is stored by the system in the non-volatile memory of the FCU. At later start-ups, the system reads this position from that memory.
- Default values are used at power-up when no position is stored in the memory.
- This position is used as the basis for positioning the weapon according to the calculated ballistics for the defined target range and current ammunition.
- **NOTE!**
  Whenever a new weapon is mounted or a new FCU is connected, the bore and the line of sight must be aligned by performing the bore sighting procedure.
- **NOTE!**
  If one of the sensors is bore sighted, it is not necessary to do the same with the other sensors.

XM153 CROWS II – The Next Evolution

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QUESTIONS ?

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