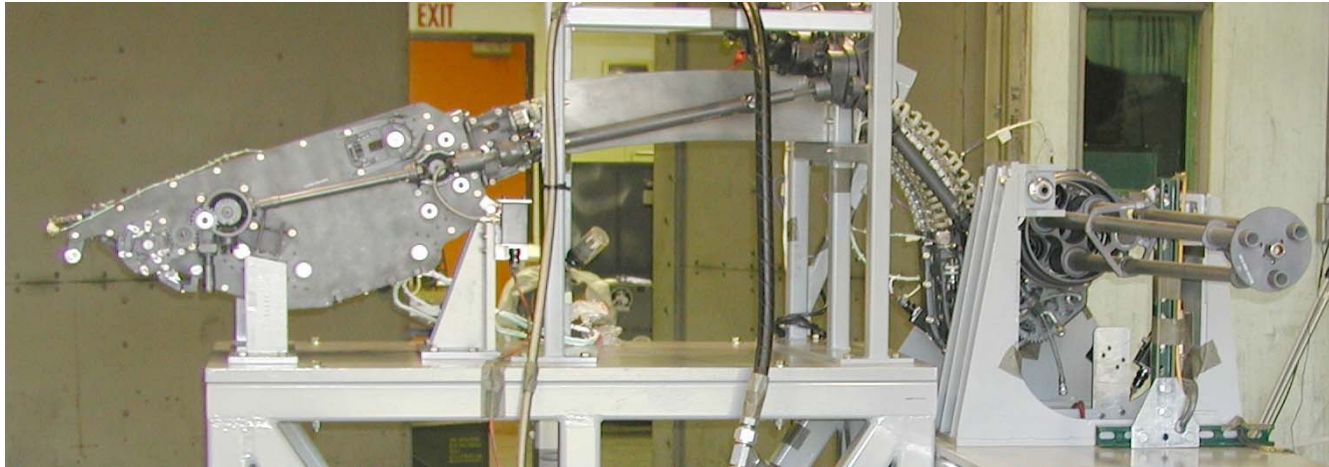


GENERAL DYNAMICS

Armament and Technical Products



42nd NDIA Gun & Ammunition Symposium

M61 Handoff Improvements

presented by:

John Fletcher III

Agenda

- Aircraft Overview
- Gun System
- Changes Made
- Summary

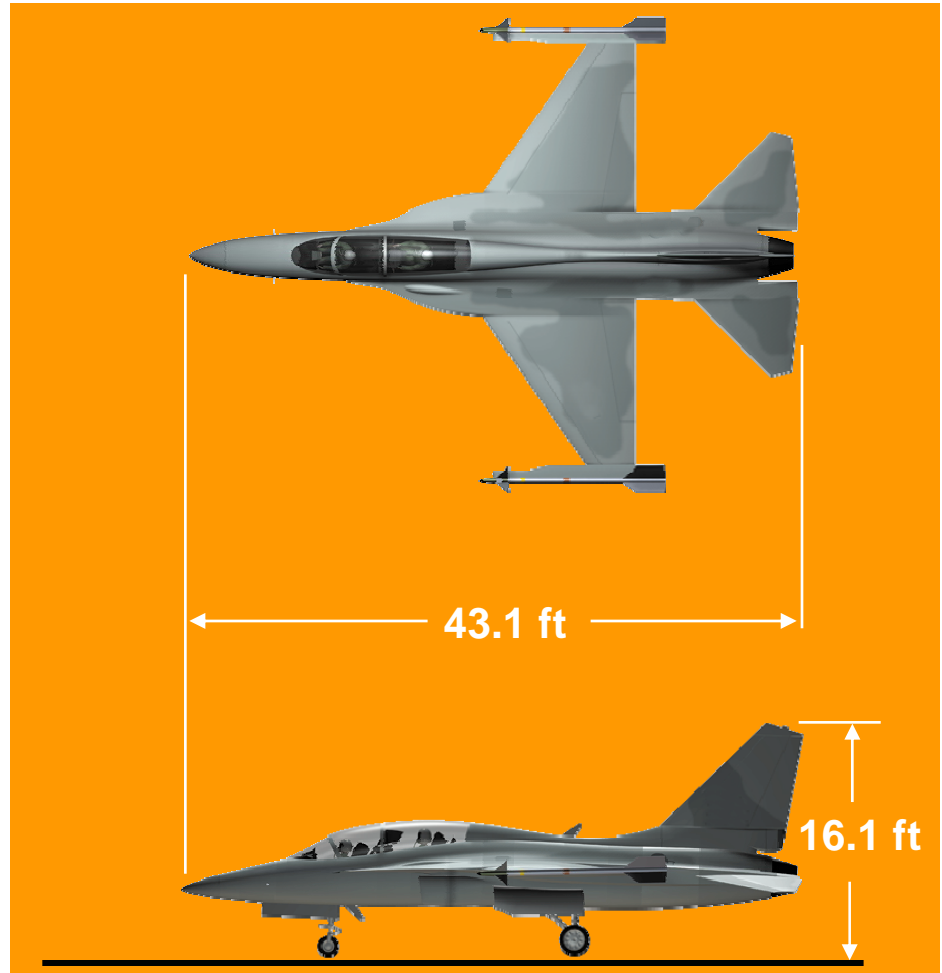
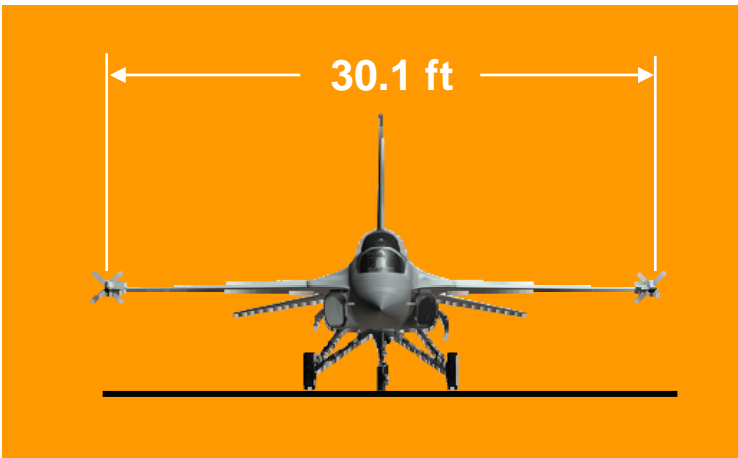
T/A-50 Golden Eagle



- Advanced Trainer & Light Attack Aircraft for ROKAF & International Markets
- KAI-LM Aero Co-Development Program (Technical Support by LM Aero)
- T-50 International (TFI) for International Marketing
- Performance: F-16 > T-50 > Hawk/F-5
- Demonstrator aircraft flying
- Production to start in 2009
- 82 fighters on order thus far

T/A-50 Characteristics

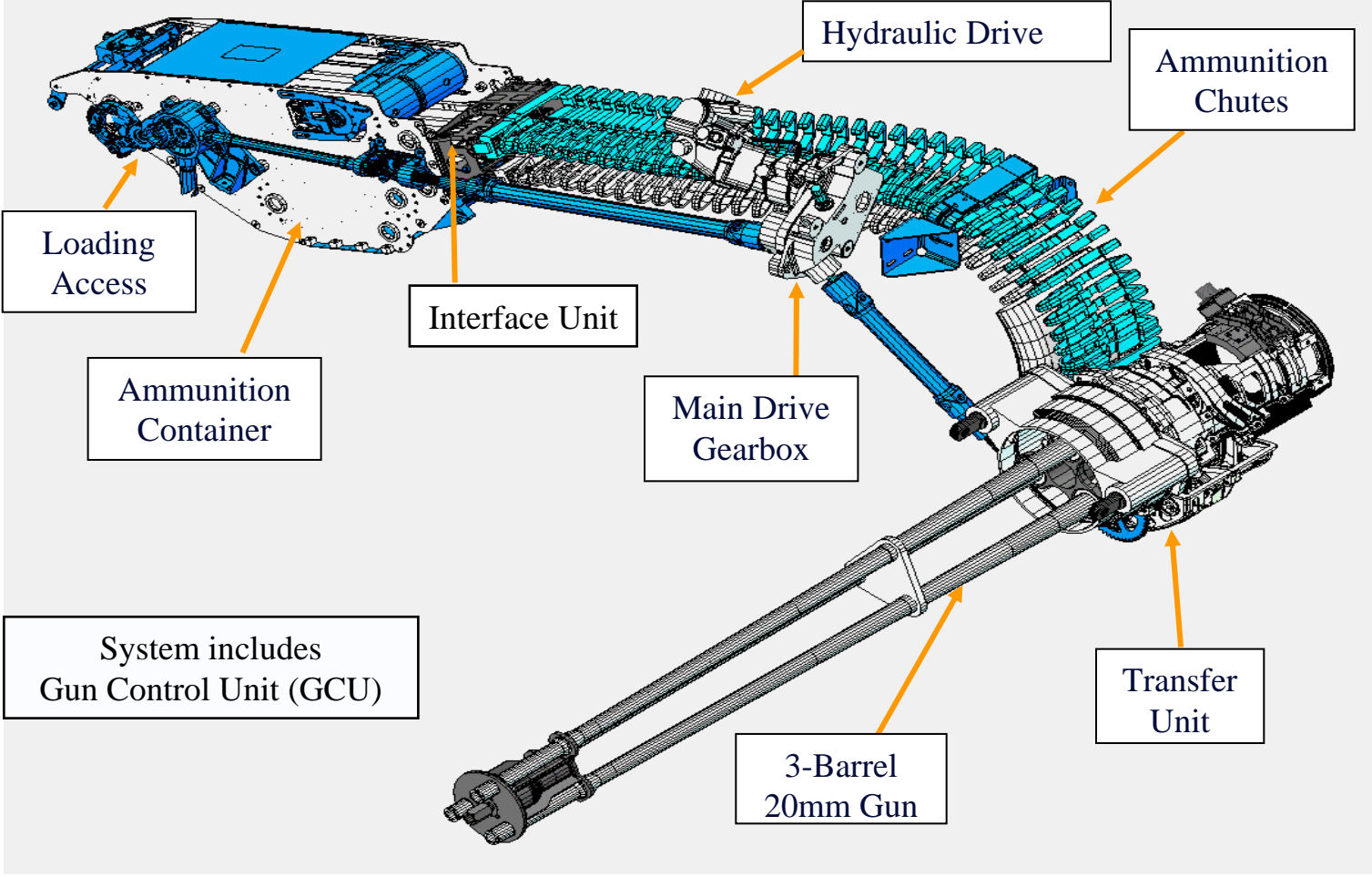
MTOGW	26,400 lb
Empty Weight	14,200 lb
Max Thrust	17,700 lb
	F404-GE-102
Performance:	
Max Speed	Mach 1.4
Service Ceiling	48,000 ft
G-Limit	-3/+8 g



Gun System Characteristics

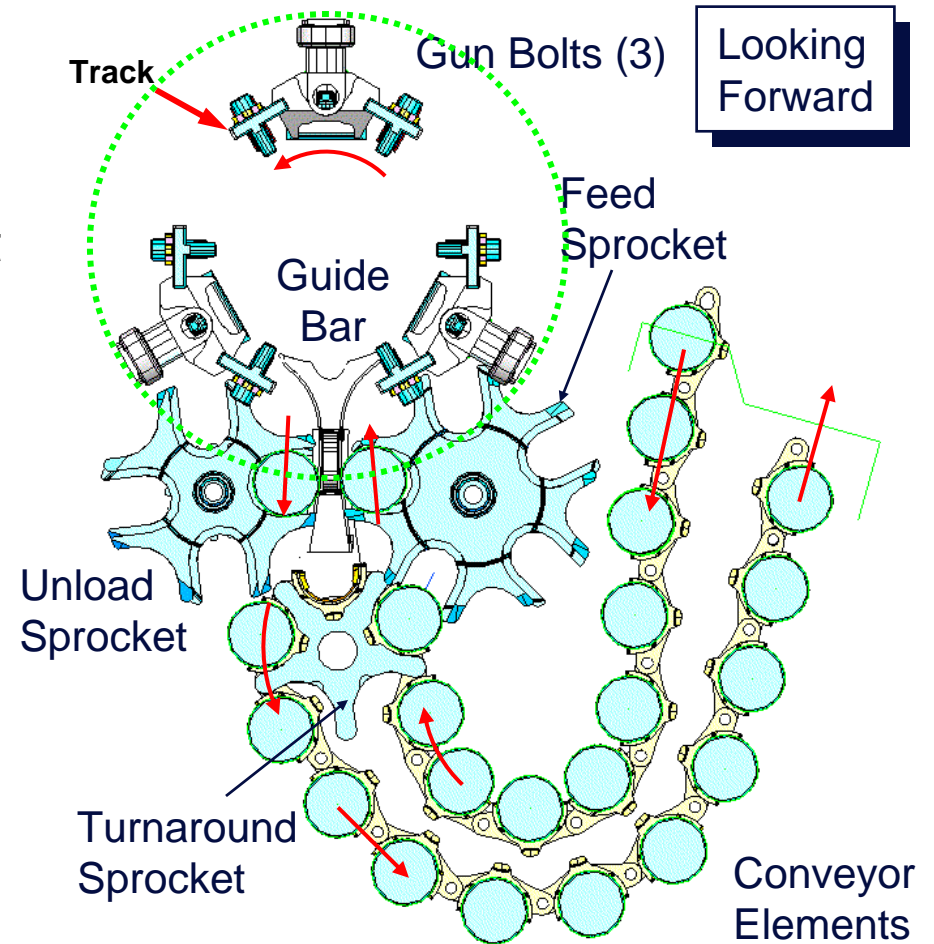
- Gun 3-Barrel Externally Powered 20mm Gatling
- Firing Rate 3,000 Shots per Minute
- Ammo Handling System Closed Loop Linear Linkless
- Ammo Capacity 204 Rounds
- Drive System Hydraulic-Mechanical
- Electrical Power 28VDC, 30 Amps Max.
115VAC, 400 Hz (Firing Circuit)
- Hydraulic Power 3,000 psi Static
20 gpm Max. Flow @ 2,400 psid
- Dispersion 8 Milliradians (80% Circle)
- System Weight (Empty) 295 Pounds

A-50 Gun System

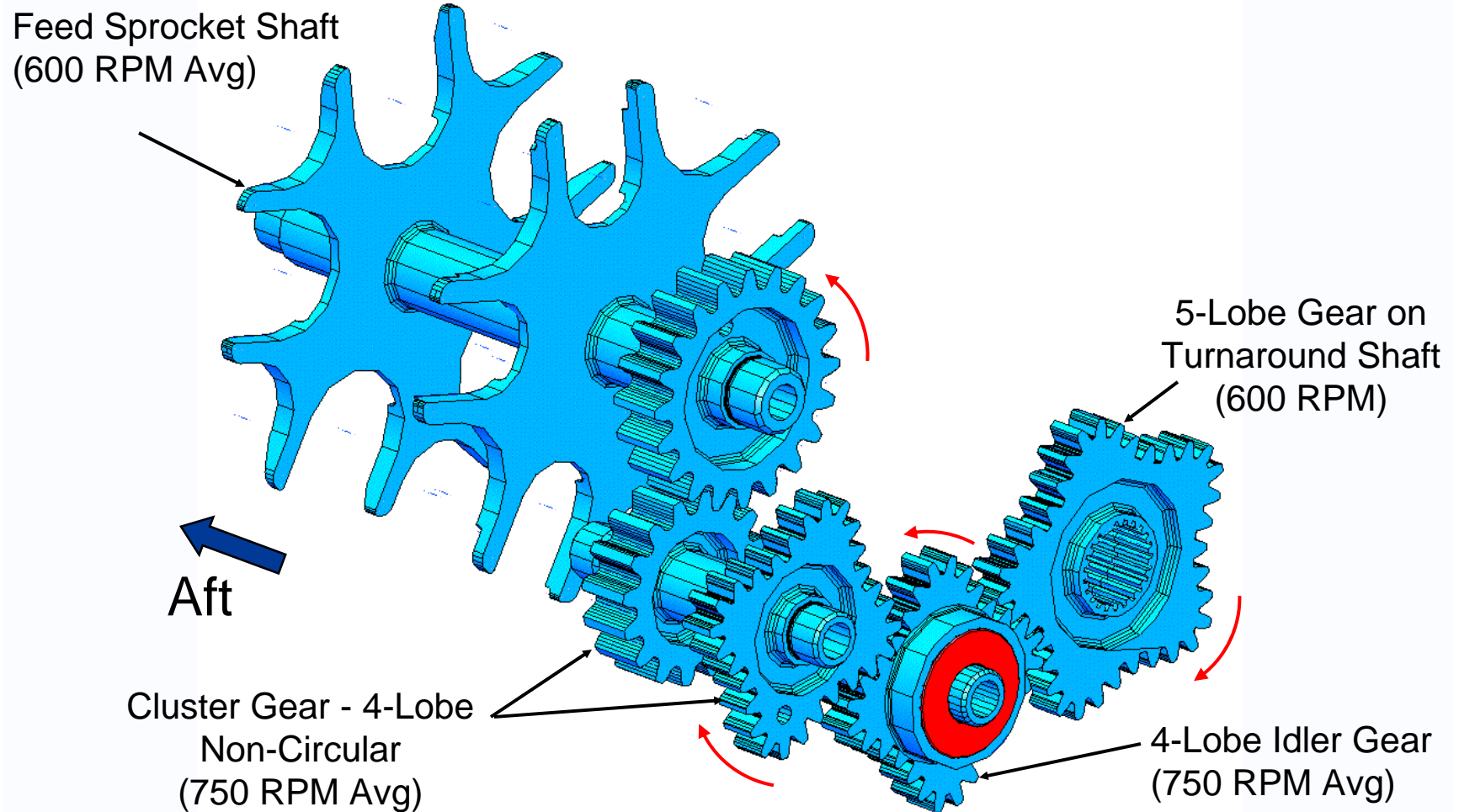


Transfer Unit Roundpath

- Feed side
 - Rounds enter via conveyor belt
 - Extracted by feed sprocket at min velocity
 - Fed into gun bolt at max velocity
- Unload side
 - Spent cases or unfired rounds extracted from gun bolt by unload sprocket at max velocity
 - Deposited into conveyor belt at min velocity



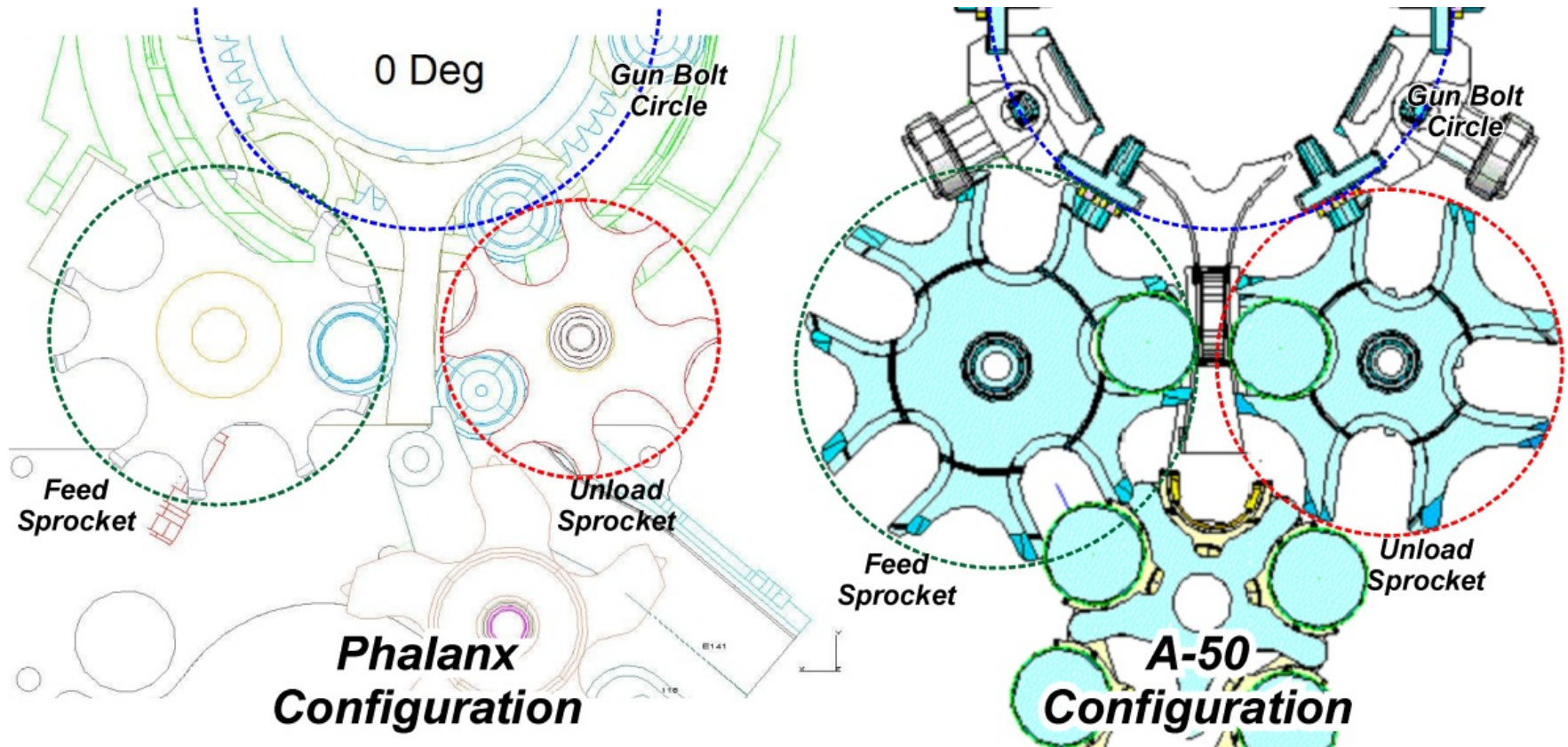
Non-Circular Gearing



Gun Heritage

- The gun was developed from the M61A2 20 mm gun
 - Three barrels removed
 - Firing rate reduced to match barrel count
- Modifications made to improve round/case handoffs
 - Gun housing
 - Clearance openings for load and unload sprockets extended
 - Bolt guide track
 - Two clearance chamfers added to center track
 - One clearance chamfer added to left forward track

Handoff Comparison



Increased diameter sprockets = improved round control at handoff

Summary

- These minor modifications to the gun allow much better round and case control during handoff
- Resulting in:
 - Less case neck denting by unload sprocket
 - Decreased likelihood of jam at round handoff
- As proven by:
 - No stoppages in the gun or transfer unit during qualification test
 - 43,000+ rounds fired on ground and in air to date by A-50 with no system chargeable stoppage

GENERAL DYNAMICS

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