

SKF



SKF eXtended Life spherical bearings reduce maintenance costs in dynamic helicopter controls

Presented at RAM VIII - Huntsville

Presented by Tony Bohm (anthony.c.bohm@SKF.com)

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SKF - Truly a Global Company

- Established 1907
- Sales 2014 SEK 70,975 million
- Employees 48,593
- Production sites around 165 in 29 countries
- SKF presence in over 130 countries
- Distributors/dealers 15,000 locations
- Global certificates ISO 14001
OHSAS 18001 certification
ISO 50001



SKF Aerospace : Global Manufacturing Sites



● Muskegon (USA)



● Baltimore (USA)



● Clevedon (UK)



● Stonehouse (UK)



● Falconer (USA)



● Valenciennes (FR)



● Elgin (USA)



● Lons le saunier (FR)



● Colebrook (USA)



● Charleston (USA)



● Sumter (USA)



● Villar Perosa (IT)



● St Vallier (FR)

● Bearings
 ● Composite
 ● Seals and Elastomeric
 ● Fly-by-Wire

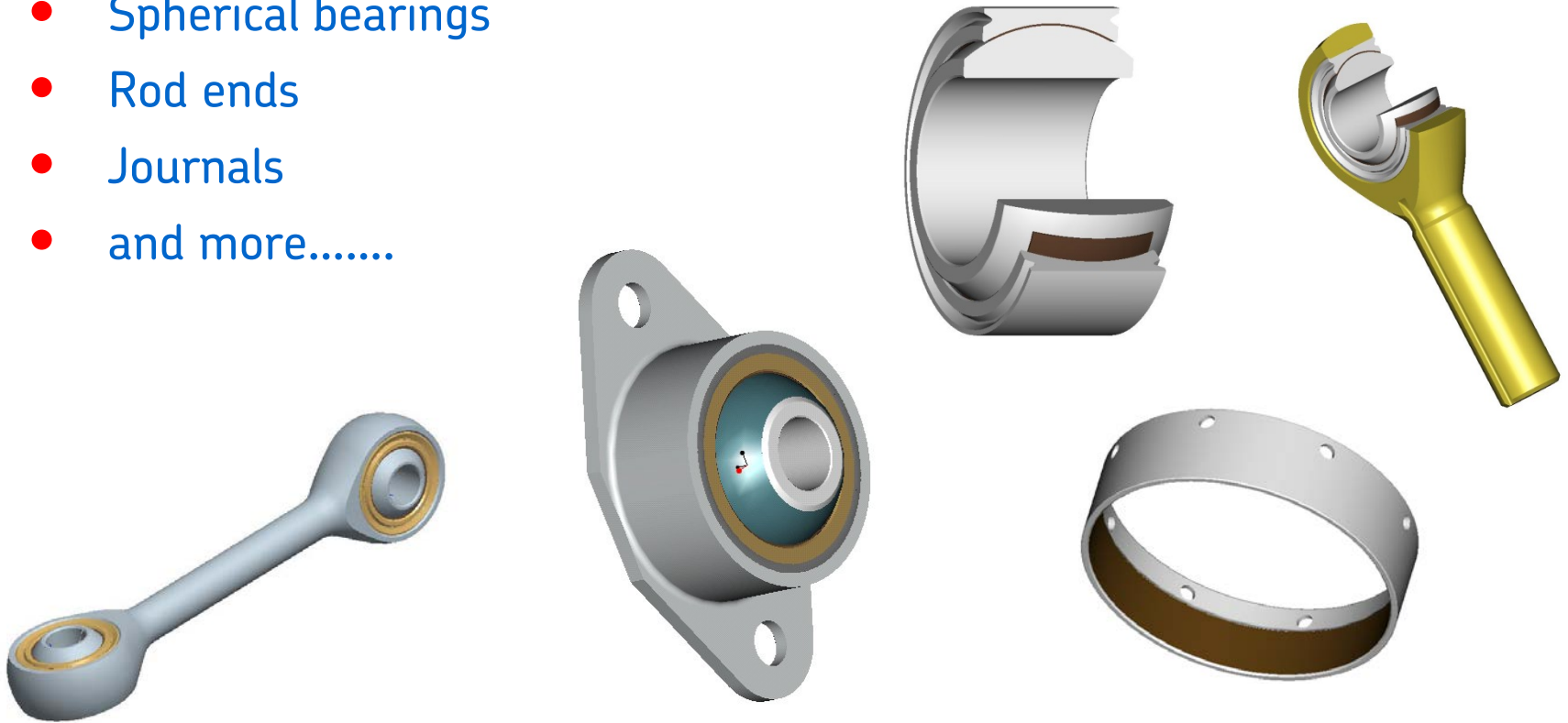
1

SKF Aerospace Spherical Plain Bearings

Product types

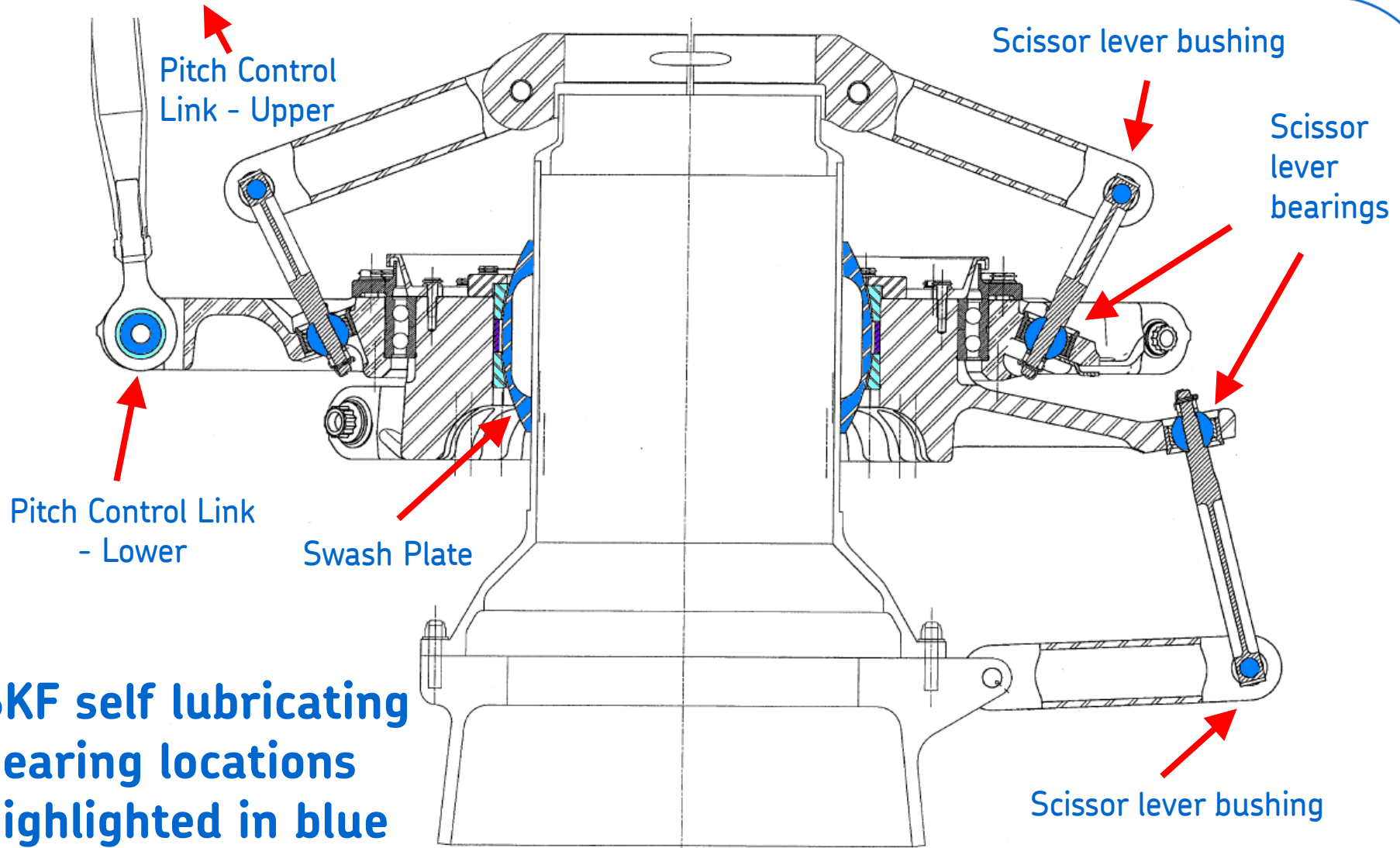
Self-lubricating plain bearing technology used in:

- Spherical bearings
- Rod ends
- Journals
- and more.....

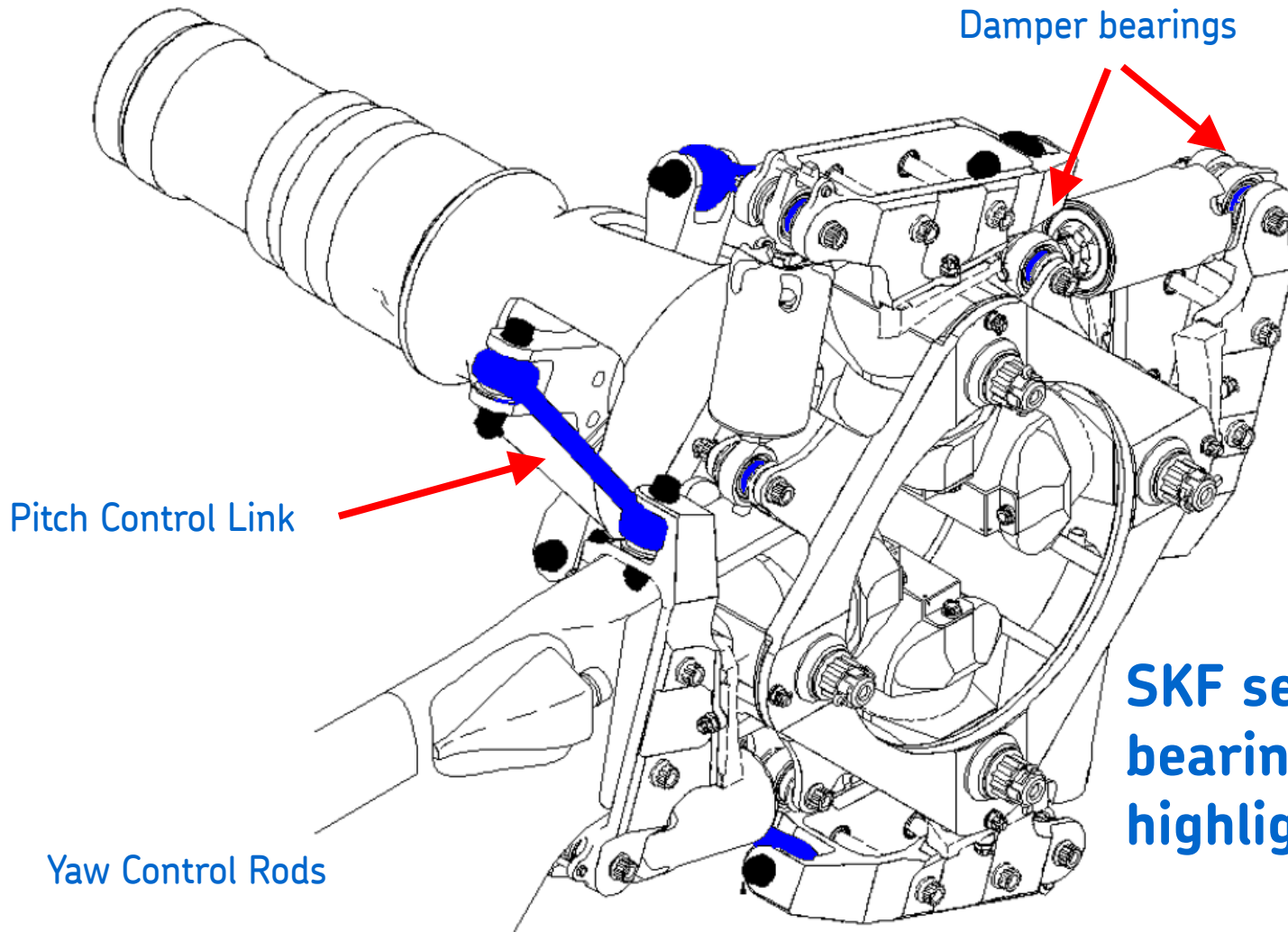


Bespoke products designed specifically to customer's requirements

Main Rotor



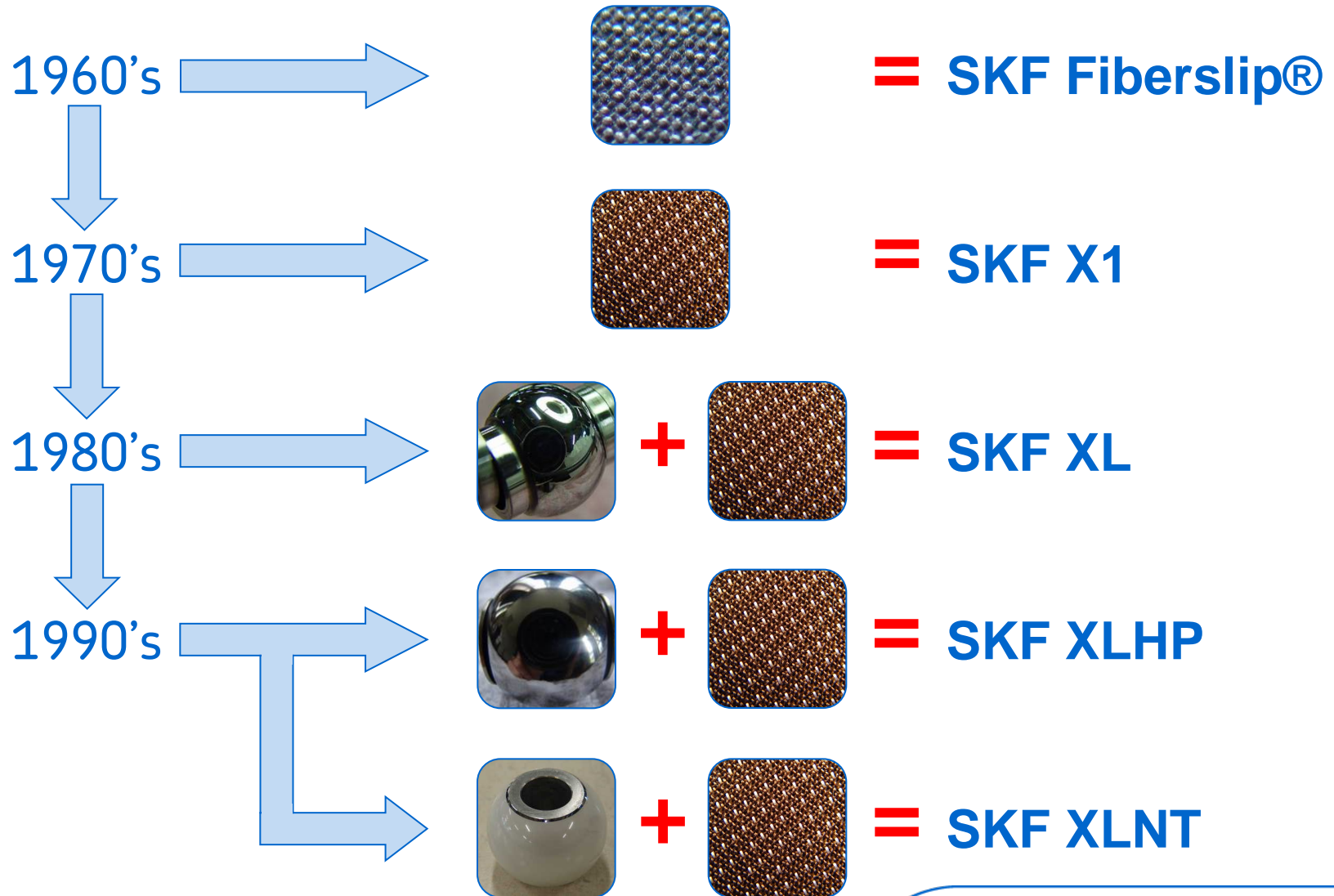
Tail Rotor



2

Spherical Plain Bearings - Performance

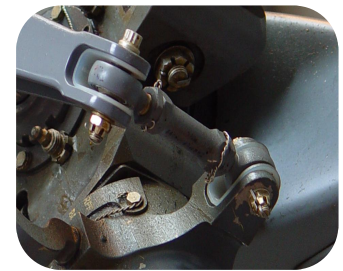
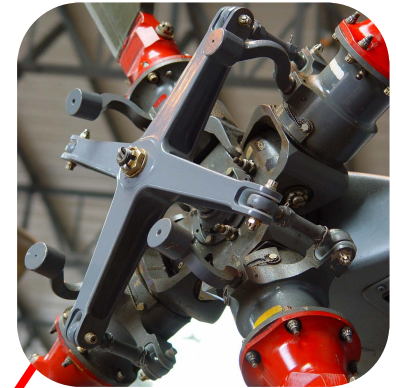
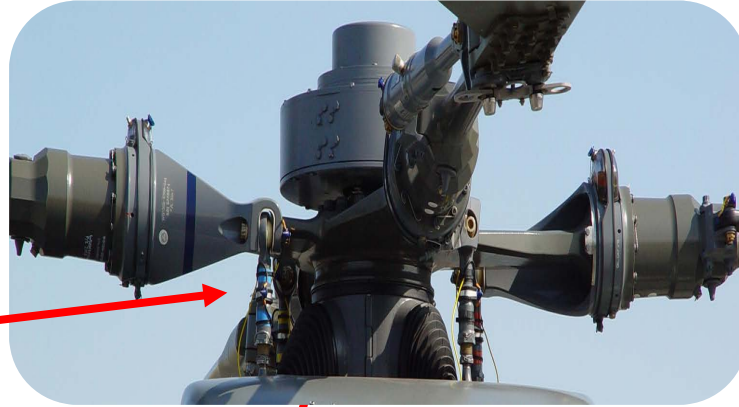
Product Range History



3

Spherical Plain Bearings - Experience

Super Lynx

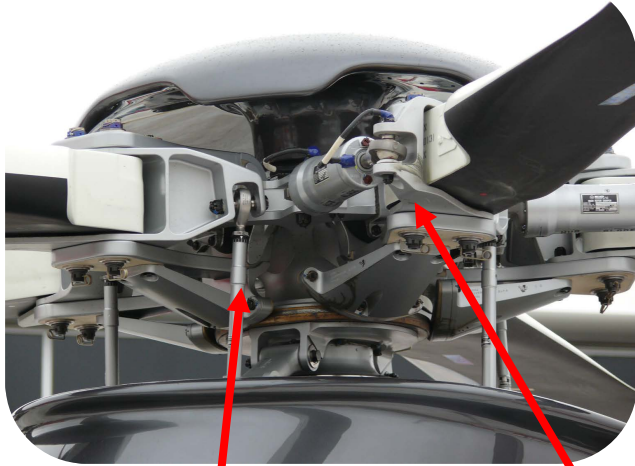


Main rotor pitch control rod ends

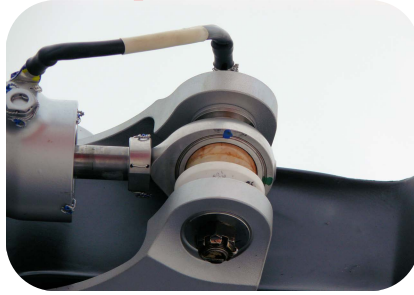


Tail rotor pitch control rod ends

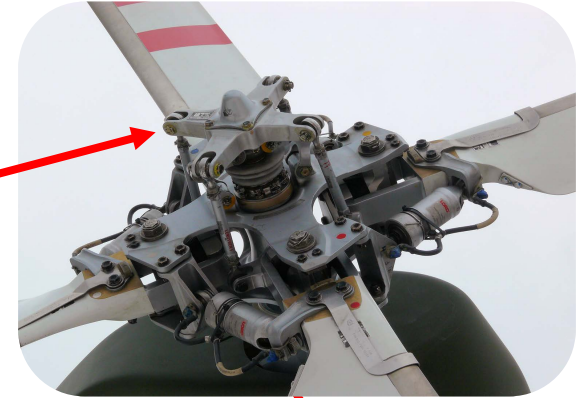
AW139



Main rotor lead lag dampers and pitch control rod ends



Tail rotor pitch control rod ends
Damper bearings



AW101



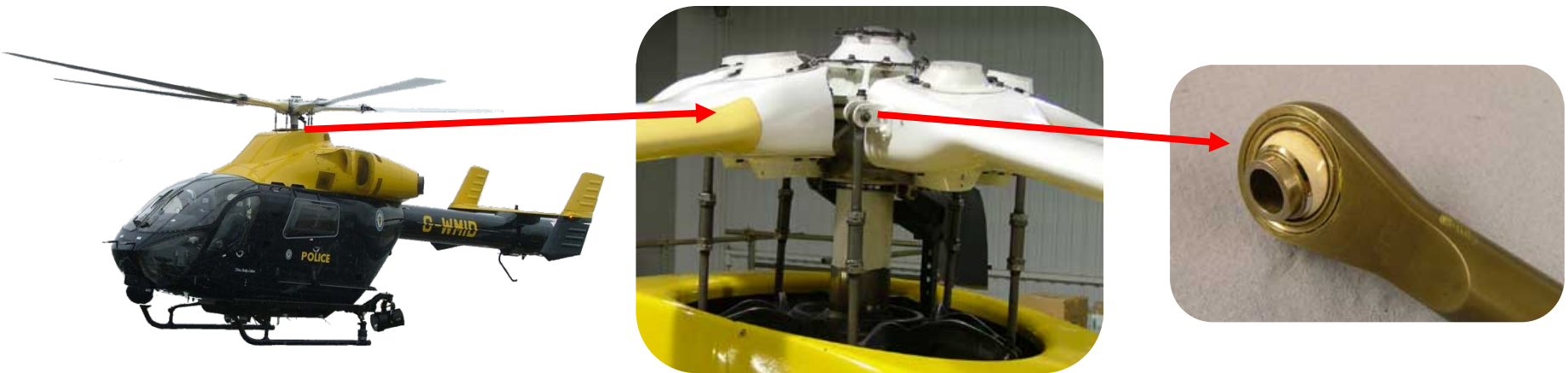
Main rotor lead lag dampers and pitch control rod ends

Tail rotor pitch control rod ends and feathering bearings



MD900

- Historically the competitor bearings had a short life (<1000 FH)
- XLNT technology bearings have been installed and monitored on a number of UK MD900 helicopters



- The performance improvement is shown on the following slides

AH-64 Apache

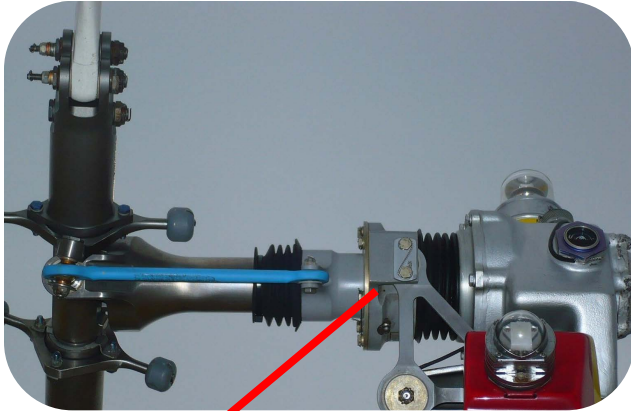
- Existing listed suppliers; Kamatics (RWG), NHBB, Kahr
- Airframes never met the required inspection intervals
- Parts frequently replaced at <100 hours in operational environment
- SKF XL achieved 3,978 hours in test at Ft. Rucker before being replaced
- SKF XLNT deployed for 18 months in the Gulf – no bearings replaced!



Main rotor:
-Pitch control rod ends (XLNT)

EC145/UH-72 Lakota

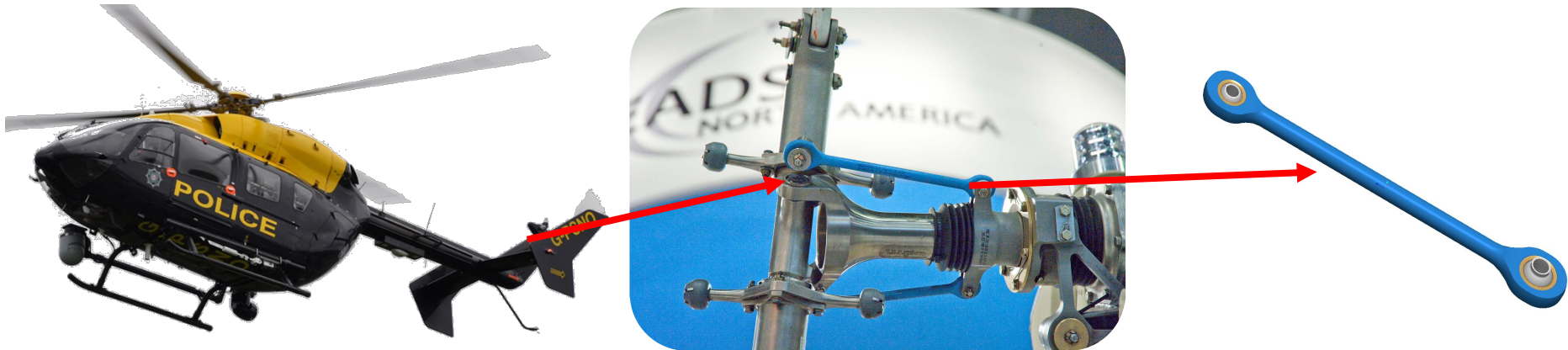
Tail rotor:
Bellcrank Bearing
Pitch control links



Main rotor:
Pitch control rod ends
Control links

EC145/UH-72 Lakota

- Historically SKF X1 technology was used within the TR pitch control (<500 FH)
- This application was then upgraded to SKF XLHP technology bearings and monitored on the EC145 helicopter



- The performance improvements are shown on the following slides

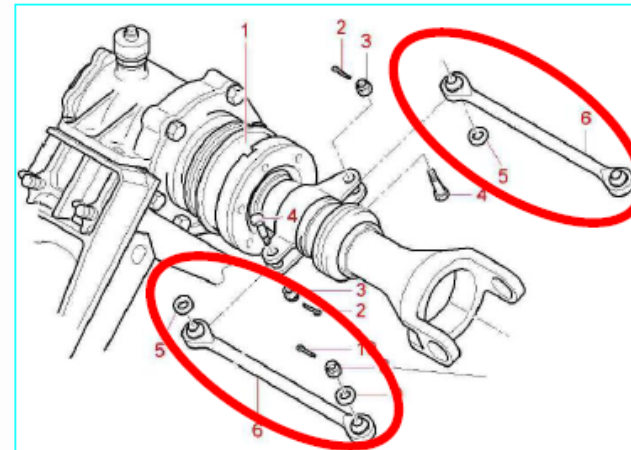
EC Presentation at HAI 2012

ATA 67 – Pitch Links 117-31822

Our Vision: Customer Focus



- Evaluation finalized; new bearings installed for 1200hrs on in-service aircraft.
- First batch of bearings are in-house (series production), more are under procurement for spares delivery (~May 2012).
- P/N11-13032P & 11-13033P
- P/N of new pitch link assy is **B642M1018102**
- Both IPC versions (BK classic and C-2) to be revised with next revision.



46



4

SKF Development Drivers

SKF Development Drivers

➤ Lifecycle cost reduction

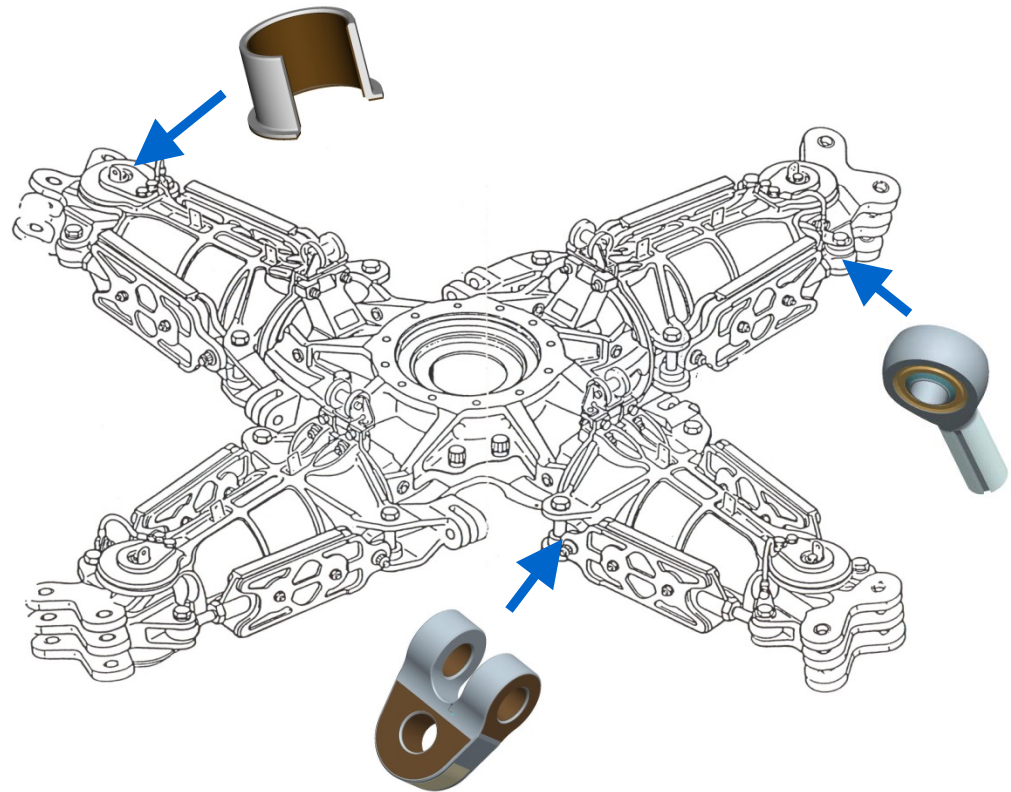
- Reduce maintenance and ease inspection
- Increase life and reliability

➤ Energy efficiency

- Reduce friction and mass

➤ Flexibility

- Speciality geometry
- Integrated solutions



What's Next....

What are your development drivers?

Are there any specific applications that are creating reliability issues?

Are there any upcoming or ongoing product improvement projects for lined bearing products that SKF could demonstrate their capabilities on?

SKF

