



Centre for Military Studies



# The Future of Airpower

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Centre for Military Studies  
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## Airpower: Increasing Effectiveness

- No Boots on the Ground
  - Airpower as First Resort
- Enabled by Modern Airpower
  - Immediacy
  - Range
  - Persistence
  - Precision
  - Safety
  - Responsiveness
  - Controllability



## Overcoming Limits

- Location Accuracy
    - GPS
  - Precision Strike
    - Laser-Guided
    - GPS
  - High Resolution Reconnaissance
    - All-weather
  - Persistent Surveillance
    - Satellites, UAVs
  - Networked Communications
    - High Bandwidth
- Increased Situational Awareness



## From Bombs per Target to Targets per Sortie



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- 1943
  - 1500 B-17 sorties
  - 9000 x 250 lb. Bombs
  - 1 Target
- 1970
  - 30 F-4 sorties
  - 176 x 500 lb. Bombs
  - 1 Target
- 1991
  - 1 F-117 sortie
  - 2 x 2000 lb. Bombs
  - 2 Targets
- 2003
  - 1 B-2 sortie
  - 16 x 2000 lb. Bombs
  - 16 Targets



## Increasing Use of PGMs

- Desert Storm: 8%
- Allied Force: 30%
- Enduring Freedom: 60%
- Iraqi Freedom: 68%
- Odyssey Dawn/Unified Protector: 100%
  - 250 Aircraft
  - 6500 PGMs
  - 5900 Targets Hit
- NATO Munitions Initiative led by Denmark



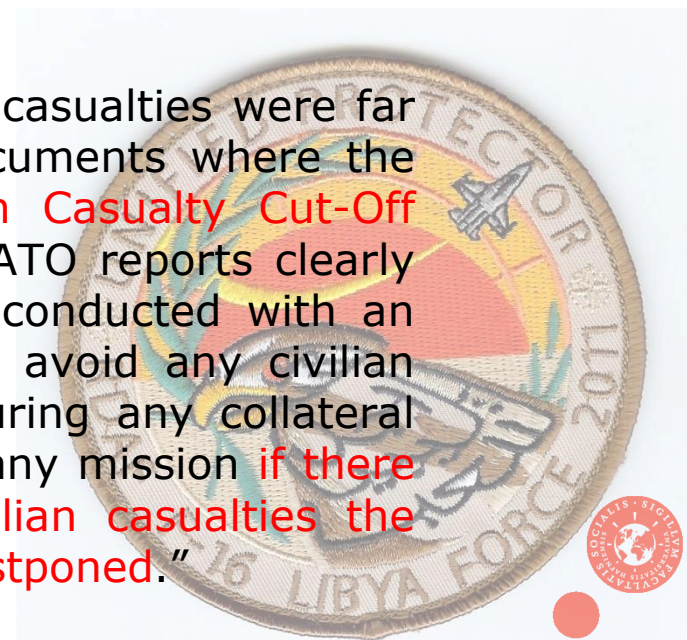


## Collateral Damage

- Allied Force 1999
  - 78 Days
  - 829 Aircraft
  - 38,004 Sorties
  - 28,236 Weapons
  - 500 Yugoslav civilians killed, 900 Injured



- Unified Protector 2011
  - "During OUP concerns about civilian casualties were far too evident in the NATO official documents where the written **Non-Combatant and Civilian Casualty Cut-Off Value were equal to zero**. Official NATO reports clearly demonstrate the air campaign was conducted with an unprecedented attention in order to avoid any civilian casualties (CIVCAS). In essence, during any collateral damage estimate (CDE) and during any mission **if there was any possibility of inflicting civilian casualties the mission would be unauthorized or postponed.**"

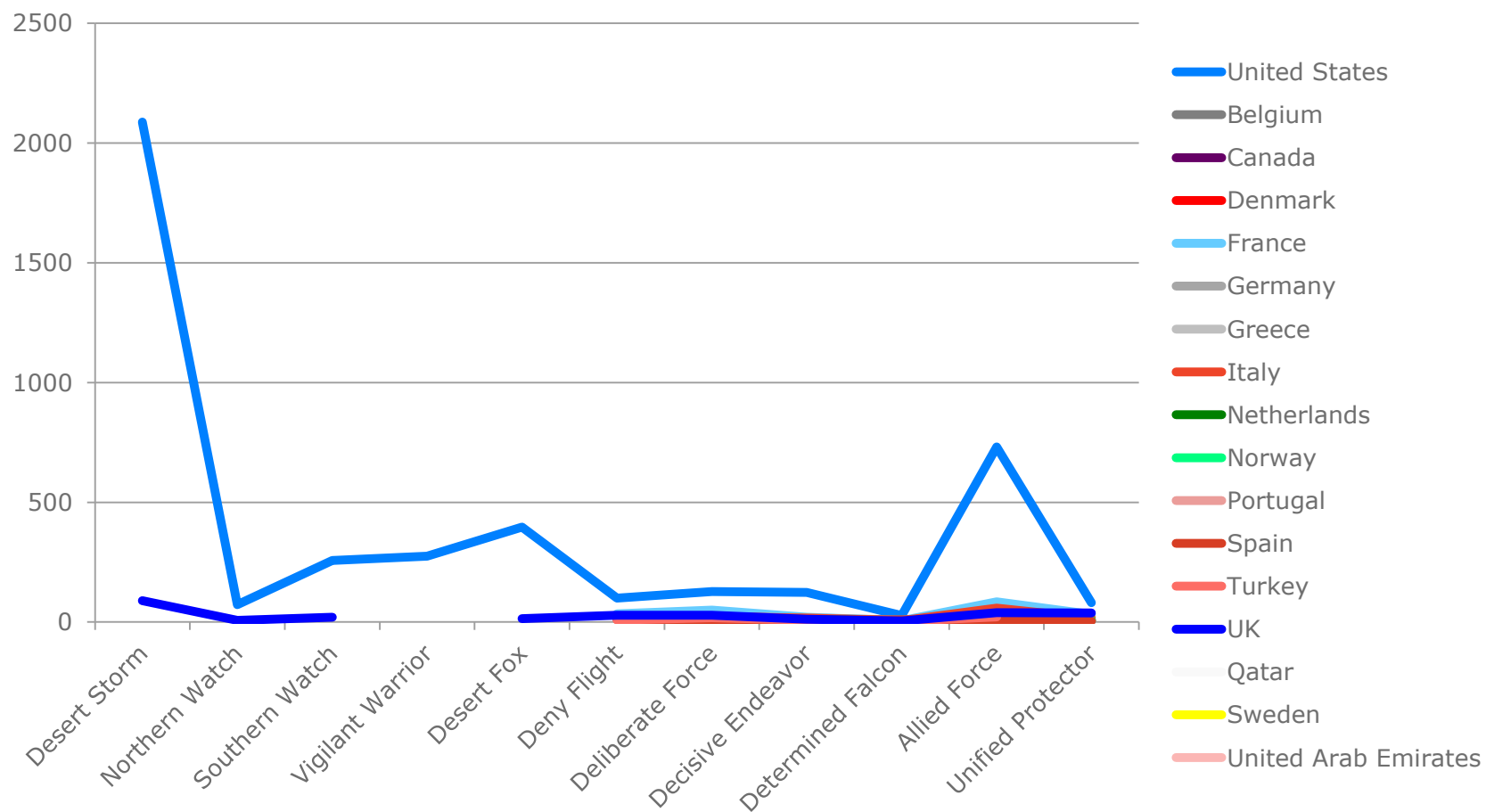


## Coalition Air Campaigns

- Value
  - Greater Capability
  - Greater Legitimacy
  - Shared Responsibility
  - Shared Risk
  - Shared Costs

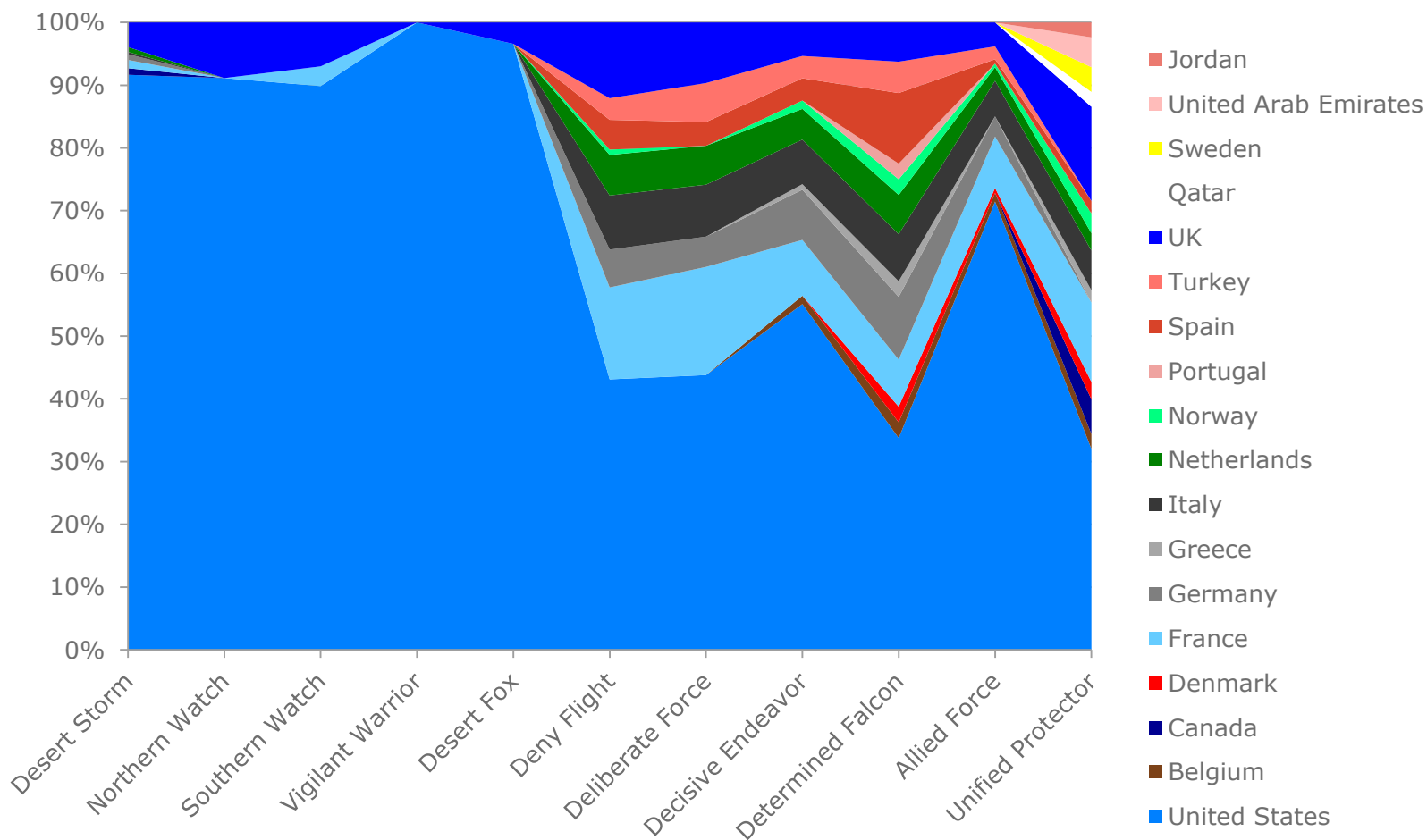


## Coalition Involvement: Aircraft #s





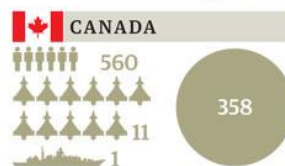
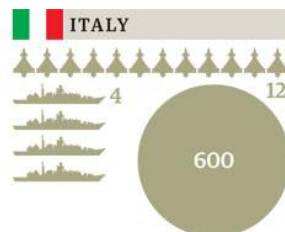
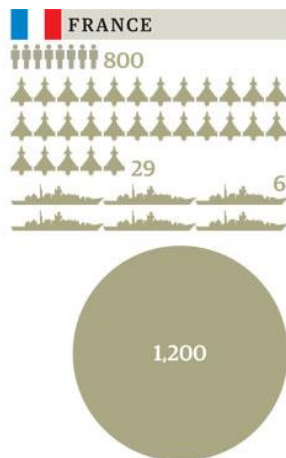
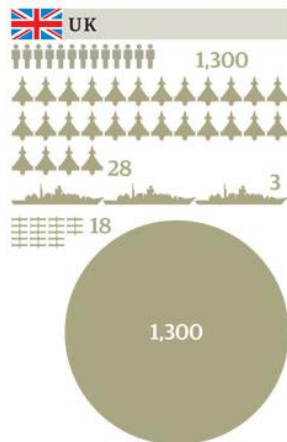
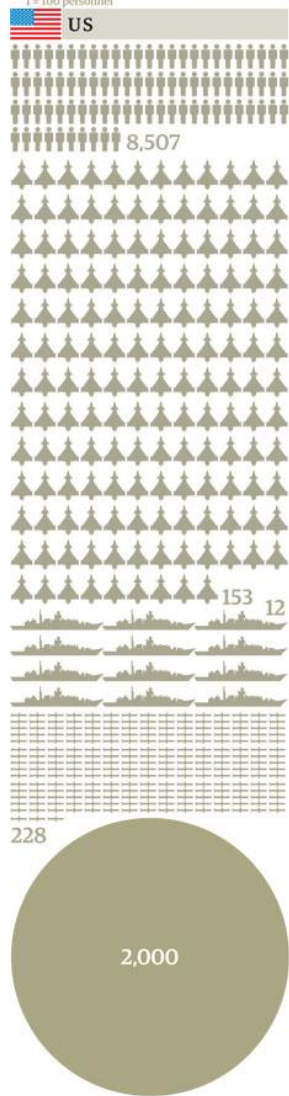
## Coalition Involvement: Aircraft Percentages



# Operation Odyssey Dawn

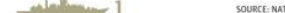
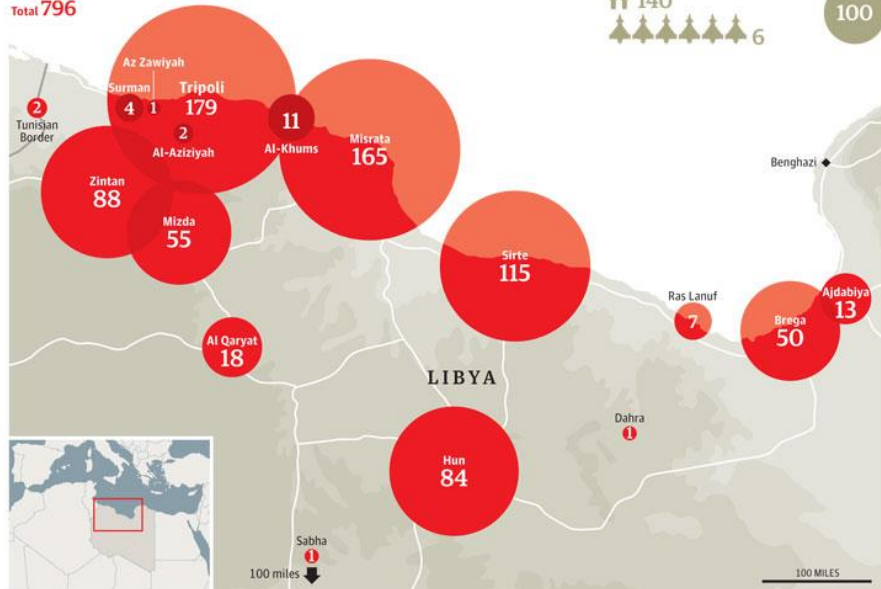
## Coalition forces and sorties flown

Personnel (where known) 1 = 100 personnel  
 Aircraft (all types)  
 Ships (all types)  
 Cruise missiles (expended)  
 Sorties flown (to 5 May)



## Attacks on named targets

Total 796

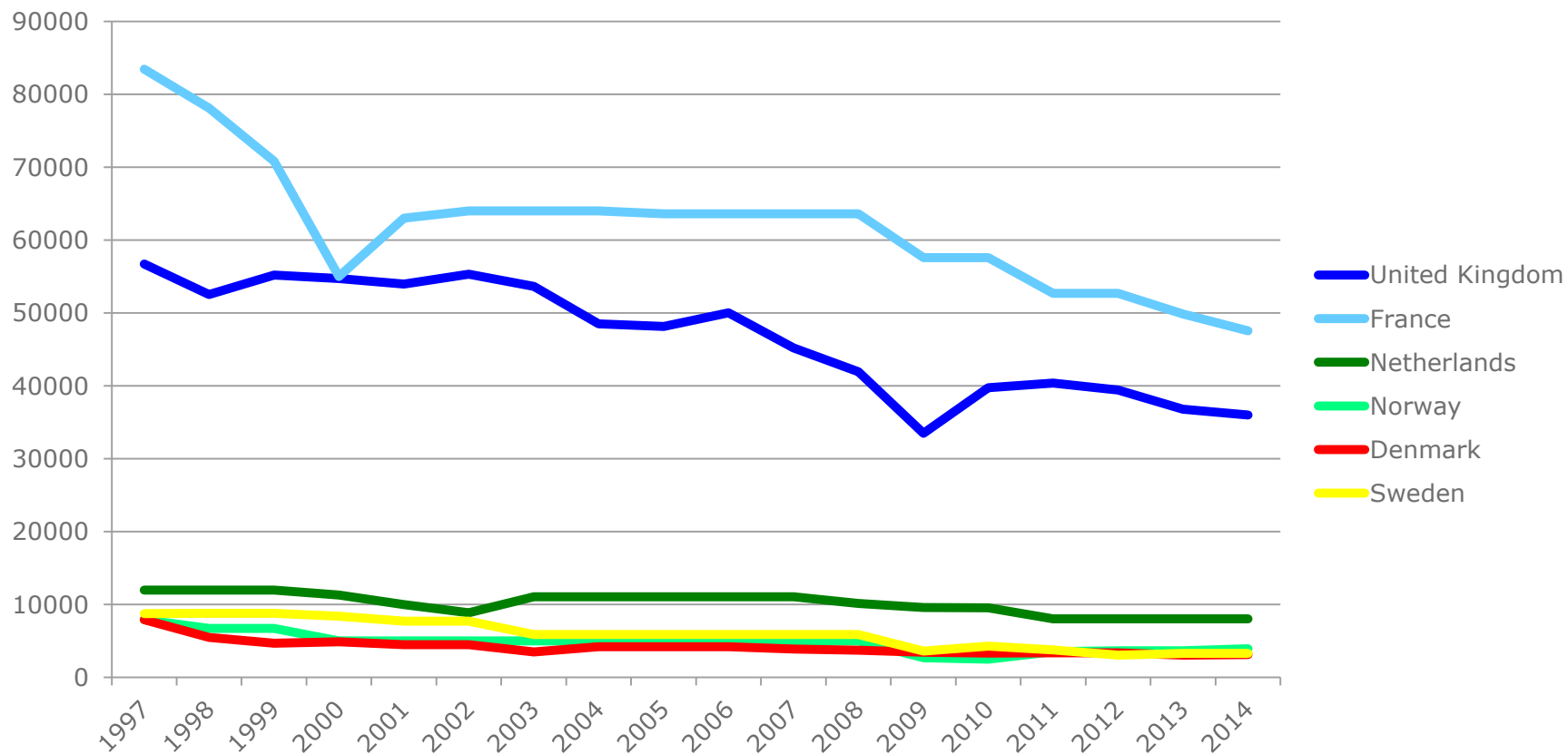


SOURCE: NATO



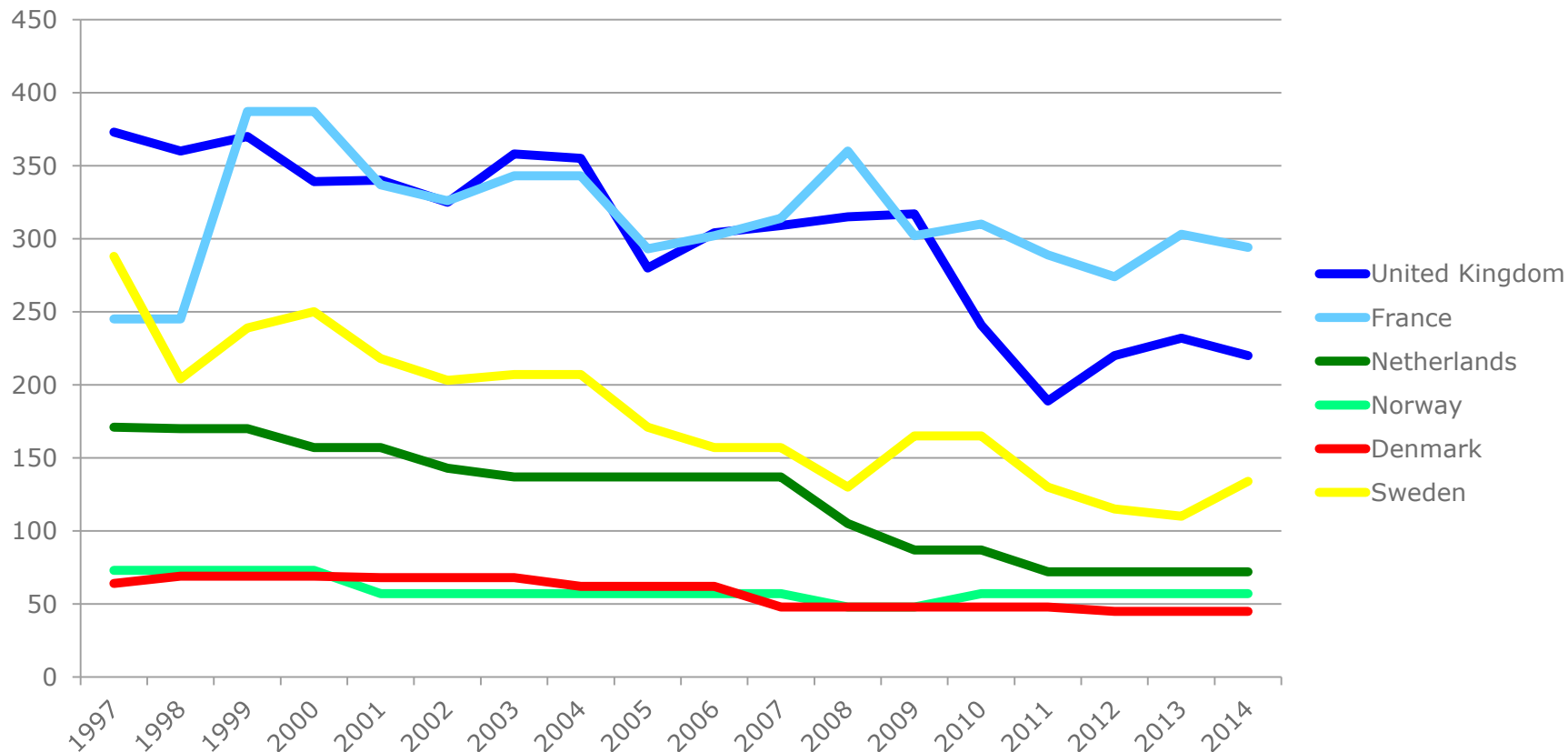
## Paradox: Increasing Activity, Shrinking Air Forces

### Uniformed Air Force Personnel



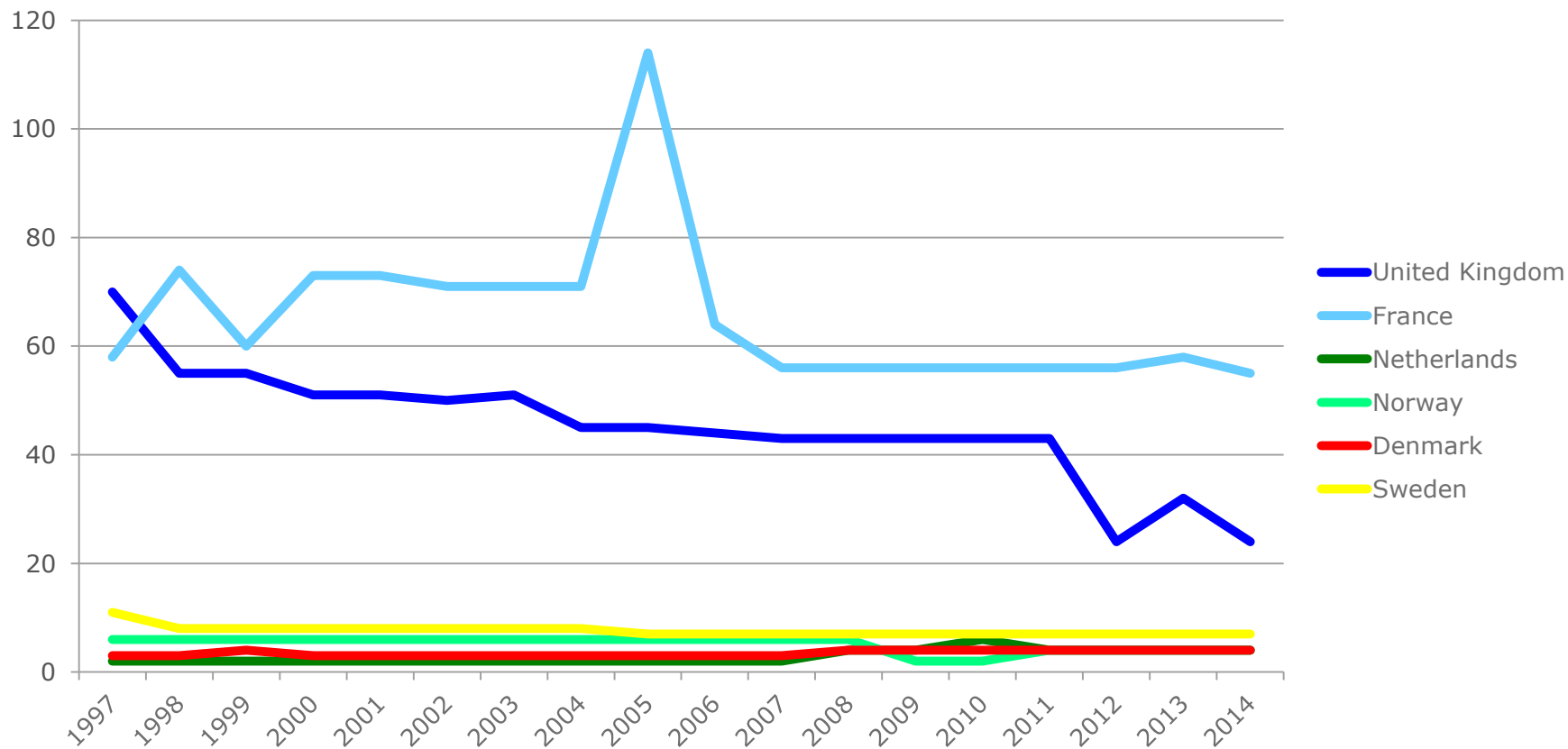
## Paradox: Increasing Activity, Shrinking Air Forces

### Fighter & Multi-Role Aircraft



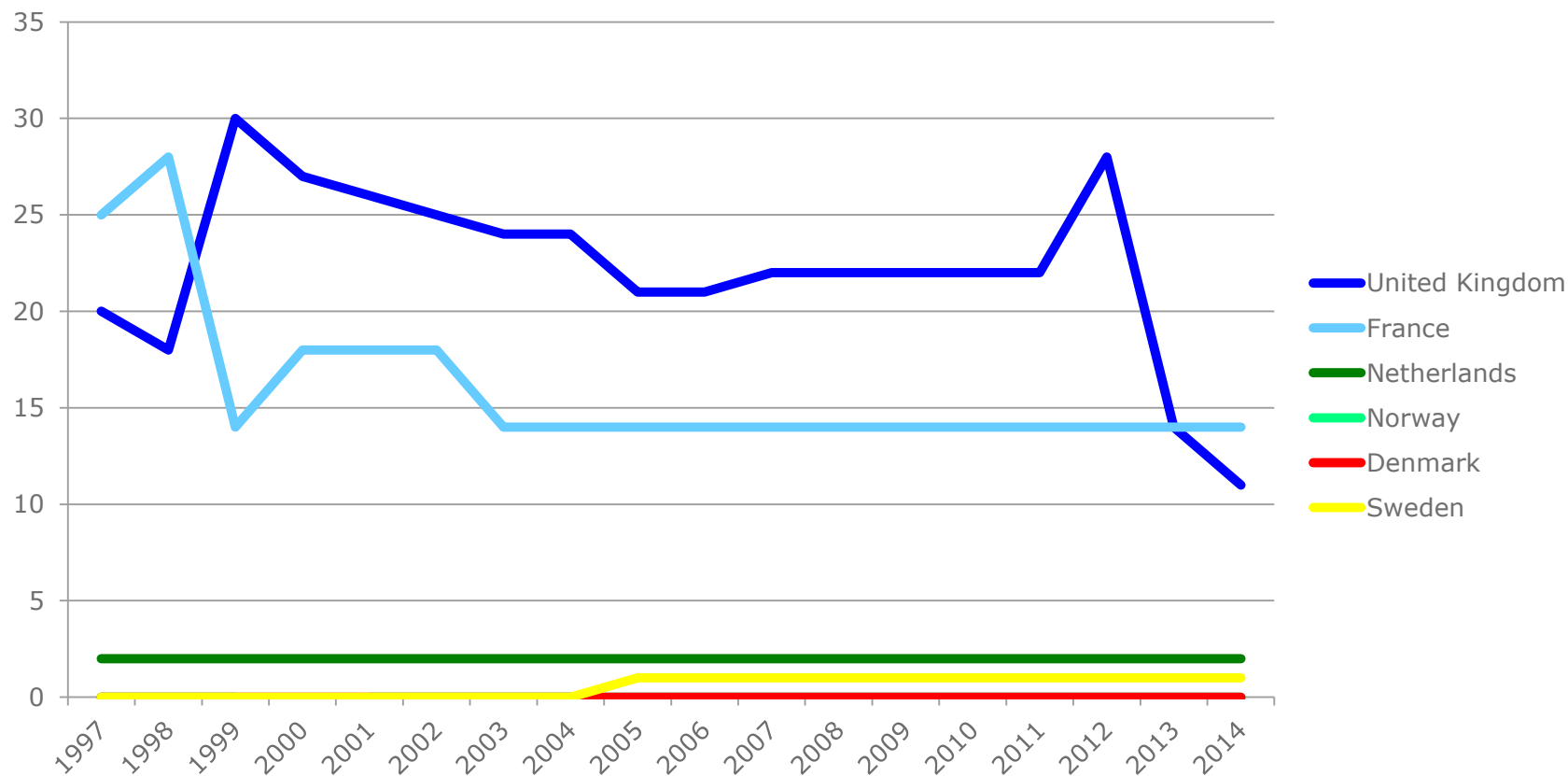
## Paradox: Increasing Activity, Shrinking Air Forces

### Medium Mobility Aircraft



## Paradox: Increasing Activity, Shrinking Air Forces

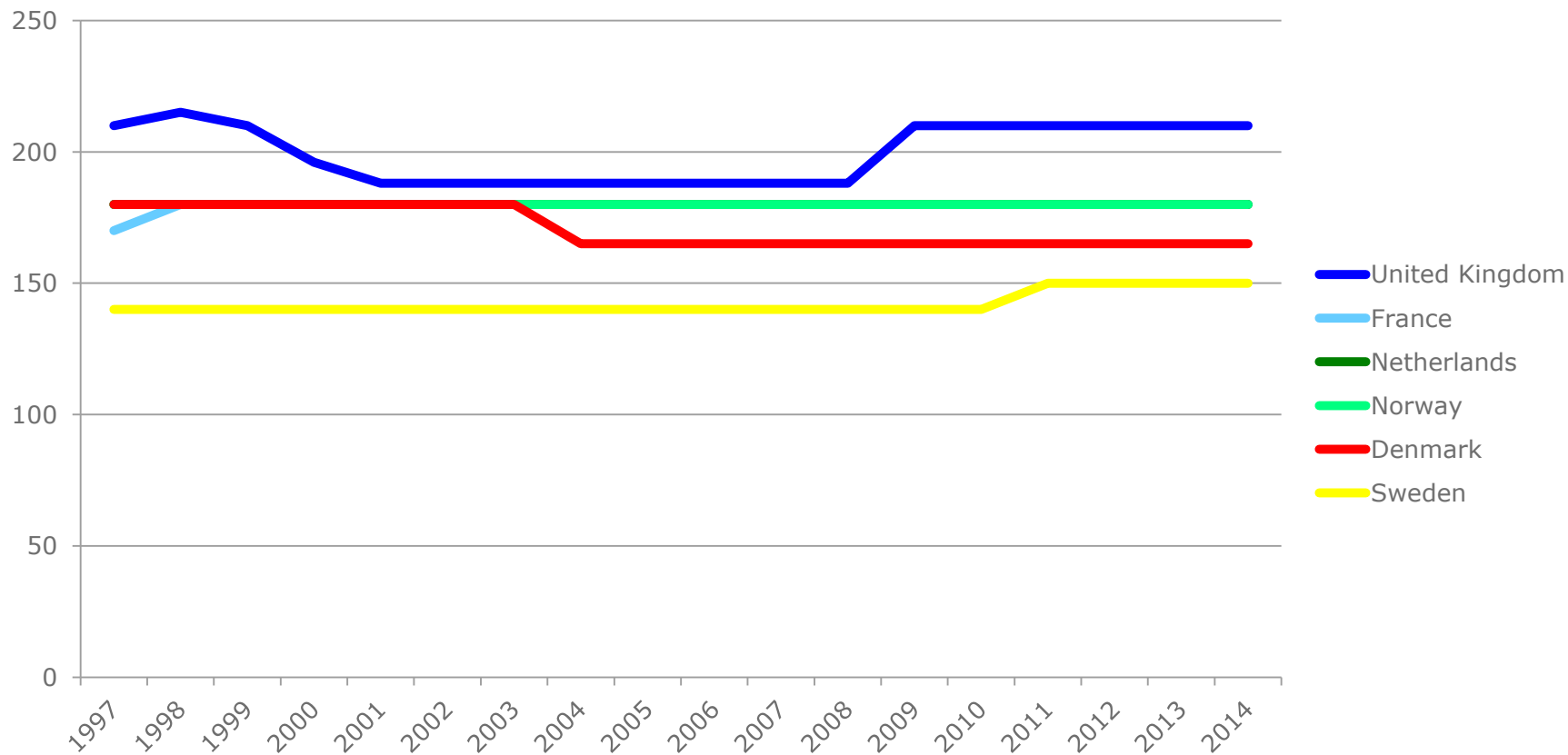
### Airborne Tankers





## Paradox: Increasing Activity, Shrinking Air Forces

### Flying Hours (Max)



## Fighter Replacement Decisions

Europe	Status	Number	Candidates	Decision Date
Belgium	Competition	30+	F-35, JAS 39E, F/A-18, Typhoon	2018
Denmark	Competition	30+	F-35, F/A-18, Typhoon	2015
Finland	Study	40+	TBD	Uncertain
Greece	Competition	100+	F-16 upgrade	2015
Italy	Negotiation	90	F-35	2014-15
Netherlands	Decision	37+	F-35	2012
Poland	Study	40	TBD	TBD
Romania	Order	12	F-16A	2014
Slovakia	Review	12	JAS 39C	Uncertain
Turkey	Review	100	F-35, F-16 upgrade	2015
UK	Review	138	F-35	2015
Canada	Review [Study]	65	F-35 [F/A-18, Typhoon, Rafael]	2014-15



## Denmark: Fighter Replacement

### 2010 Defence Agreement

- Strategic Issues
- Capability Issues
- Industrial Issues
- Financial Issues

### Process

- 23 July: Bids Received
- Aug–Nov: Bids Assessed
- Nov–mid 2015: Evaluation
- Mid-2015: Political Debate & Decision



## Take Aways

- Western Airpower
  - Increasingly Capable & Increasingly Called Upon
- Western Air Forces
  - Have Shrunk to Permit Some Modernization
  - Have Adapted to Expeditionary Operations
  - Require Investments
    - Aircraft
    - Training & Education
    - Personnel
- Future
  - Coalition Operations
  - Partnerships





# Thank you