



European Air Group

Improving Capability through Interoperability

Agile Combat Employment: Lessons from the Cold war





What is ACE?

- Agile Combat Employment
 - Established by USAFE – taken on by other NATO nations
- Dispersal and protection of assets
- NATO defines it as:
 - Dynamic Basing at Home, Deployment Overseas & Dispersal.
- All nations involved –
 - Sending Nation, Host Nation, Both
- Coalition environments



What is ACE?

- Nothing new, we just forgot –
- The threat changed –
- Cold War thinking and doctrine –
- Hiding aircraft in tree lines in West Germany –
- But we can't do that anymore, can we?
- Well actually we can, and we probably should!



What is the EAG doing with ACE?

- Working hand-in-hand AIRCOM to achieve –
- A 'European Solution' to –
- Compliment (not compete with) the USAFE work.
- Investigations with nations lead to –
- The development of –
- Agile Basing Project (ABP).



Agile Basing Project

- Start with 7 nations, plus SWE & FIN, AIRCOM, JAPCC & SHAPE
 - A new project to tackle ACE enabling for EAG nations and beyond.
 - ESTABLISH an Airfield Decision Process:
 - a smarter way to choose airfields – MOB, FOB, FARP (A, B, C)
 - DEVELOP an Airfield Database (not just EAG nations):
 - an unclassified information repository for use by all nations.
 - IDENTIFY gaps and areas of consideration in:
 - Logs & Maint, Logs Spt & Infra, CIS and FP



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Airfield Decision Process



Minimum Requirements for an Aircraft

- EAG – What are the basic minimum requirements for an aircraft?
 - For a Human – Water (Food, Shelter, Warmth)
 - For an aircraft – A landing strip (Fuel, Weapons, Shelter)
- US AIR FORCE DOCTRINE NOTE 1-21 – Agile Combat Employment

"To generate combat power from a number of locations to create dilemmas for an adversary...I just need a runway, a ramp, a weapons trailer, a fuel bladder, and a pallet of [Meals, Ready-to-Eat]. That's maybe a little bit bold, but the point is, we've got to be light, lean and agile."

General CQ Brown, Jr., Chief of Staff of the Air Force Remarks to Air Force Association Air, Space, and Cyberspace Conference as Commander, Pacific Air Forces, September 2019



Airfield Decision Process

LEVEL 0:

Airstrip/Runway:

- Location:
 - Home
 - Abroad
- Geography:
 - Europe
 - NATO
 - Coalition
- Type
 - Airfield
 - Autobahn
 - AC carrier
- Status
 - Active
 - Inactive
- Category
 - Well found
 - Austere
 - Bare
- Infra
 - Dimensions
 - Surface condition
 - Pavement composition



LEVEL 1:

Type of Aircraft:

- Fast Jet:
 - 4th vs 5th Gen
- Big Wing:
 - Tactical
 - Strategic
 - AAR
 - ISTAR
- RPAS/UAV:
 - Class I micro/mini
 - Class II med tactical
 - Class III MALE/HALE
- Rotary:
 - Attack
 - Cargo
 - Transport
- Pilot Facilities

LEVEL 2:

Logs/Maintenance:

- Maintenance:
 - Flight Servicing
 - Line
 - Depot
- Interoperability:
 - Combined vs Cross
- AGE/GSE:
 - Compatibility
 - Pre-positioning
 - TAs
- Parts Sharing:
 - Within fleets
 - Between fleets
 - Industry Support
- Technicians:
 - Competency
 - Recognition
- Weapons
 - Storage
 - Interoperability
- Host nation Spt

LEVEL 3:

Logs Spt & Infra:

- Host nation Spt:
 - ADR:
 - Storage
 - Capacity
 - Transport
 - Fuel:
 - Power
 - Water
 - Bandwidth / Security
 - Utilities:
 - ATC
 - CFR / Medical
 - Aircraft shelters
 - Arrestor Gear
 - Airfield Support:
 - RLS:
 - Accommodation
 - Catering
 - Laundry

LEVEL 4:

CIS / Cyber:

- CIS Interoperability
 - Between nations
 - With NATO
- Secure Comms:
 - NATO
 - HN
 - Interoperability
 - Reach back
- SCIF/SAP(F):
 - Deployment of
 - Security of
 - Access to
- Simulators:
 - Requirement for
 - Interoperability
 - Security of
- Aircraft Comms:
 - TDL (Link 16)
 - Radios (Voice/Data)
 - SATCOM (V/D)
- Host nation Spt:

LEVEL 5:

Force Protection:

- Accessibility:
 - Transport links
 - Roads
 - Rail
 - Access/Egress
- Location:
 - Urban
 - Rural
- Perimeter Security:
 - Fence
 - Cameras
- Airfield Security:
 - Access
 - Ground handlers
- Inner layers
 - 5th Gen
 - SCIF/SAP(F)



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Airfield Database



Airfield Database

Gap Analysis

- NATO AIRCOM does not have a database of airfield capabilities.
- EAG steering group asked PS to look into a database of armed airfields for use in ACE.
- Nations may have their own, may have recce reports on other nations airfields, or host nation reports may exist.
- EDA investigating usage of Civilian Airfields.



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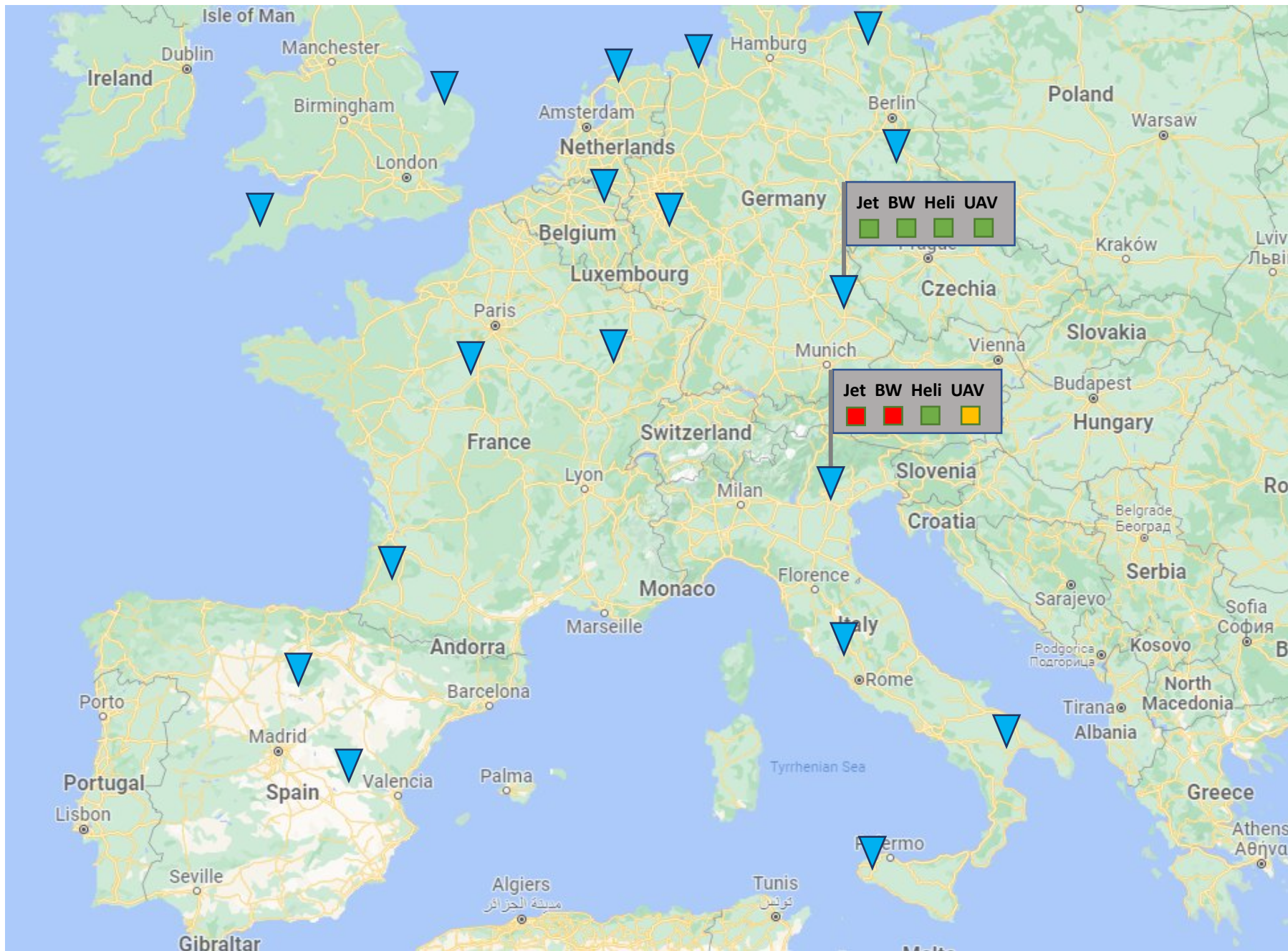
Infra

- Dimensions
- Surface condition
- Pavement composition



Airfield Decision Process

- Agile Combat Employment – agile and flexible
- Create options, be less predictive for a potential opponent
- Overview and a collection of options for HQs to assess
- Start at the unclass level / open data first – sharable
- Potential to upgrade with classified content
- Focus on Combat Aircraft first
- Expand to all kinds of air assets



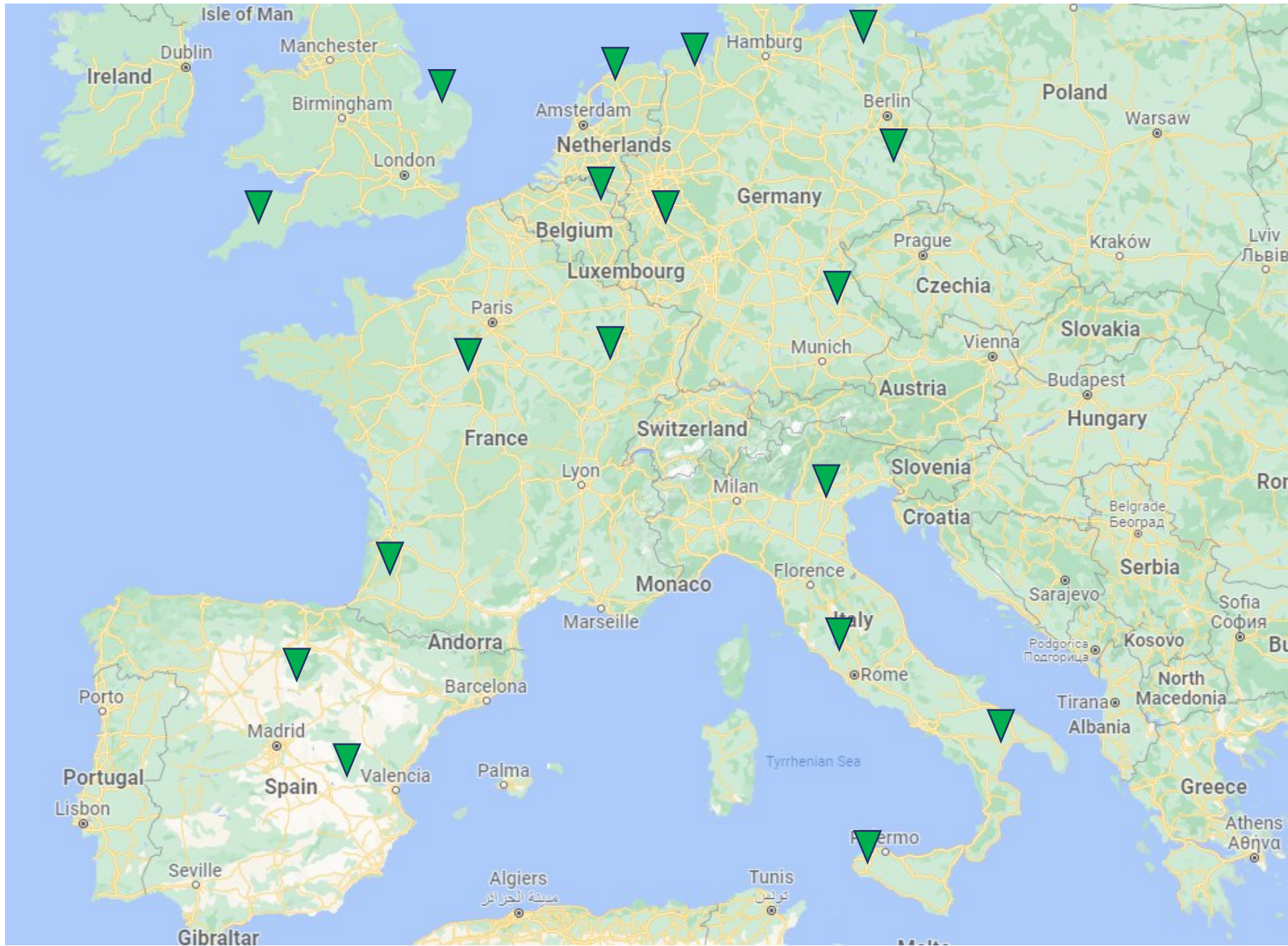
Option 1:

Simple Pre-Loaded -
flag + colour matrix of
airfield capability to
take different types of
Aircraft.

Could include a
hyperlink to more
detailed information
behind.

Information already
contained in airfield
handbook, pre-loaded
onto map.

Reviewed every year for
changes.



Option 2:

Complex and interactive
- database of airfield
capabilities.

Information on all
factors affecting the
airfield's ability to
handle certain types of
aircraft.

Starts all green.



Option 2:

As parameters are input into the database via a filter system, airfield markers turn amber and then red. Those that fit your criteria, remain green.

- ▼ Fully capable
- ▼ Semi-capable
- ▼ Non-capable

A semi-capable base may still be useable, but requires upgrades and works, more CSS provision or risk acceptance.



Technician Interactivity/Familiarity



Technician Interactivity

- Return of cross-country flights (Ample Gain / Ample Train)
- Need to re-establish cross training of technicians.
- Cross-servicing teams, what can they do?
 - Through Flight? More? FARP?
 - How do you maintain currency?
 - Example is DEU-CZE Typhoon/Gripen



Building Trust

- Familiarity?
- Technical Arrangements?
- Mutual recognition – AWAG
- NATO - STANAG 3430 / SH-Ops 60 / ASSEP 13 - AIRCOM



TLP for Technicians

- Championed by FRA.
- Suggestions of Solenzara in Corsica or TLP at Albacete in Spain.
- Certified see-in, see-off and through flight inspections.



AGE/GSE Interoperability/Compatibility



Issues

- European NATO nations lack the mass of equipment to self-sustain at multiple locations or to preposition collectively.
- Lack of training environments where the sortie is secondary
 - Must be prepared to fail!
- Train as we fight?
 - Airworthiness restrictions – Post Article 5 mindset!
- Lack of opportunities to compare and contrast different aircraft.
 - TLP, Exercises (RAMSTEIN FLAG, TIGER MEET, PITCH BLACK)



Solution

- Nations need a 'European Solution' to fill the gap.
 - Need to know interfleet compatibility. Ongoing trials.
- USAFE is pre-positioning equipment at 12 bases thru 2024.
 - Nations need to apply individually to use on an on-call basis.
- NATO AIRCOM (Thru NSPA) purchasing 24 sets of equipment based on compatibility trials work.
- ***Note: The work involved in accessing compatibility is easy compared to the time taken to establish national clearances for use.***



'Big 10' AGE/GSE items tested for compatibility

Tow Bar

Tractor

Power Set/GPU

Cockpit Steps/Ladder

Axel Jack

Tripod Jack

Portable Crane

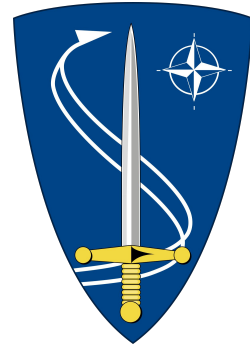
Nitrogen Cart

Weapons Loader Tractor

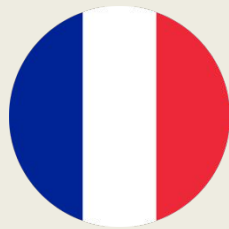
Weapons Loader Mounting Plate



TLP 23-4 – 20-24 Nov 23



F-18



Rafale



EF2K

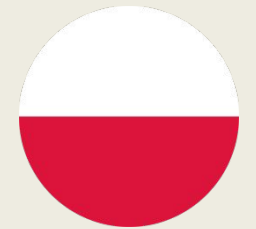
Participating Nations



Mirage



EF2K



F-16



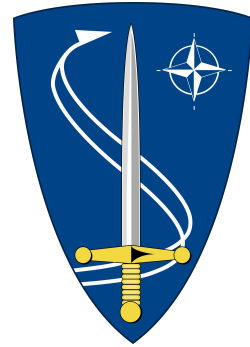
EF2K vs Rafale*

| RAFALE AGE | Fits EF 2000? | Notes | | EF 2000 AGE | Fits RAFALE? | Notes |
|----------------|---------------|---|--|----------------|--------------|---|
| Tow Bar | Red | | | Tow Bar | Red | |
| Tractor | Green | | | Tractor | Green | |
| Power Set | Red | | | Power Set | Yellow | Prior to testing of civil/military interlock switch |
| Cockpit Steps | Red | | | Cockpit Steps | Green | |
| Axel Jack | Green | | | Axel Jack | Red | |
| Portable Crane | Green | | | Portable Crane | Green | |
| Nitrogen Cart | Green | | | Nitrogen Cart | Yellow | Only proven for pneumatic tyres |
| Tripod Jack | Red | | | Tripod Jack | Yellow | Requires FRA to bring adaptors |
| Weapon Loader | Yellow | An adapting plate would be required, does not currently exist | | Weapon Loader | Yellow | An adapting plate would be required, does not currently exist |
| NATO Tow Bar | Green | | | NATO Tow Bar | Green | |
| | | | | | | |


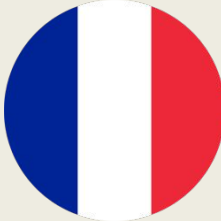




* FRA Navy Rafale



TLP 24-1 – 29 Jan – 2 Feb 24



Participating Nations

| | | | | | | |
|--|--|---|--|--|--|--|
|  |  |  | |  |  |  |
| EF2K | – Rafale | – Gripen | | F-16 | – EF2K | – F-18 |



CZE Gripen Comparison

| | CZE Gripen | CHE F-18 | ESP F-18 | FRA Rafale | GRC F-16 | ITA EF2K |
|--|---------------|---|---|---|---|---|
| Tow Bar Name: VSN: | | Specifically Made | | | | |
| Tractor Name: VSN: | X | X | | X | X | X |
| Power Set Name: VSN: | | Coupling round, does not fit with any other | Coupling round, does not fit with any other | Coupling round, does not fit with any other | Coupling round, does not fit with any other | Coupling round, does not fit with any other |
| Cockpit Steps Name: VSN: | | Specific clip on steps like Rafale | Specific clip on steps like Rafale | Specific clip on steps like Rafale | Specific clip on steps like Rafale | Specific clip on steps like Rafale |
| Axel Jack Name: VSN: | | Can only carry 10T, too little | Can only carry 10T, too little | Can only carry 10T, too little | Can only carry 10T, too little | Can only carry 10T, too little |
| Portable Crane Name: VSN: | X | X | | X | X | X |
| Nitrogen Cart Name: VSN: | | Just tyres, not shock absorbers | Just tyres, not shock absorbers | | | Just tyres, not shock absorbers |
| Tripod Jack Name: VSN: | | Might weight connection all wrong | Might weight connection all wrong | Might weight connection all wrong | Might weight connection all wrong | Might weight connection all wrong |
| Weapon Loader Name: VSN: | | | | | | |



FRA Rafale Comparison

| | FRA Rafale | CHE F-18 | CZE Gripen | ESP F-18 | GRC F-16 | ITA EF2K |
|--|---------------|---|---|---|---|---|
| Tow Bar Name: VSN: | | FRA design for Mirage and Rafale | FRA design for Mirage and Rafale | FRA design for Mirage and Rafale | FRA design for Mirage and Rafale | FRA design for Mirage and Rafale |
| Tractor Name: VSN: | | | | | | |
| Power Set Name: VSN: | | Physically tested – question about radar | Gripen self-starts Needs cooling air | Physically tested – question about radar | Not tested but specs okay | Not tested but specs okay |
| Cockpit Steps Name: VSN: | | Rafale specific steps | Rafale specific steps | Rafale specific steps | Rafale specific steps | Rafale specific steps |
| Axel Jack Name: VSN: | | Main wheel okay, nose wheel wrong socket | | Main wheel okay, nose wheel wrong socket | Main wheel okay, nose wheel wrong socket | |
| Portable Crane Name: VSN: | | | | | | |
| Nitrogen Cart Name: VSN: | | Use for tyres, but not for shock absorbers | | Use for tyres, but not for shock absorbers | | |
| Tripod Jack Name: VSN: | | F-18 is too heavy for the 15T jacks – risk? | Ball and socket opposite way round | F-18 is too heavy for the 15T jacks – risk? | Too Short | Too short |
| Weapon Loader Name: VSN: | | Cradle compatibility Tractor needs testing | Cradle compatibility Tractor needs testing | Cradle compatibility Tractor needs testing | Cradle compatibility Tractor needs testing | Cradle compatibility Tractor needs testing |



AGE/GSE Compatibility by Item - Towbar

| Towbar | F-35 | F-22 | F-18 | F-16 | F-15 | EF2000 | Tornado | Rafale | Mirage | Gripen | NATO | US PDE |
|---------|------|------|-------|--------|------|--------|---------|--------|--------|--------|------|--------|
| F-35 | Grey | | | | | | | | | | Grey | Grey |
| F-22 | | Grey | | | | | | | | | Grey | Grey |
| F-18 | | | Grey | Yellow | | Red | | Red | Red | Red | Grey | Grey |
| F-16 | | | Green | Grey | | Green | | Red | Yellow | Red | Grey | Grey |
| F-15 | | | | | Grey | | | | | | Grey | Grey |
| EF2000 | | | Red | Red | | Grey | | Red | Red | Red | Grey | Grey |
| Tornado | | | | | | | Grey | | | | Grey | Grey |
| Rafale | | | Red | Red | | Red | | Grey | Green | Red | Grey | Grey |
| Mirage | | | Red | Yellow | | Red | | Green | Grey | Red | Grey | Grey |
| Gripen | | | Red | Red | | Red | | Red | Red | Grey | Grey | Grey |
| NATO | | | Green | Green | | Green | | Green | Green | Green | Grey | Grey |
| US PPE | | | | | | | | | | | Grey | Grey |



Work with USAFE

- Initial look at pre-positioned AGE in Lithuania in Feb, compatibility tested with BEL F-16 and FRA Mirage.
- Upcoming visit to Estonia to see the HUB Equipt and move to Latvia to test against DEU EF2K.
- USAFE invited to join the ABP project starting with next meeting in SWE in May 24.
- In depth briefings on BLADE and C2IMERA to understand if they can fill the airfield database gap.



Findings

- NATO Aircraft are not interoperable!
- Build a bigger sample size – continue compatibility trials
- Field tests become the norm for green and yellow items
 - Actual usage of AGE/GSE on 'foreign' aircraft is essential
- 5th Gen trials
 - Must get into 5th Gen aircraft (F-22, F-35) to complete matrix
- Don't forget the older legacy aircraft
 - Tornado, F-15, F4 – jet trainers



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Issues



Constraints on Interoperability

- Denial of access to some AGE/GSE – 5th Gen F-22 & F-35
 - Need access to complete trials.
- Reluctance to test equipment on aircraft – Power Starter
 - ‘leap of faith’ – build trust and accept some risk.
- Removed items from compatibility list – Hydraulics Rig
 - Common standards and specifications.
- Purchase of specific AGE/GSE – ITA, FRA tow bar
 - Universal equipment – interoperability over economics.



Weapon Loading

- Weapon Loading Issues:
 - Will [your] tractor fit under [my] aircraft
 - Will [my] cradle fit [your] mounting plate
 - If not, is there an adaptor, can I make one?
- A full weapon loading trial is required:
 - Tractors
 - Mounting Plates
 - Cradles
 - Adaptors



Other Ideas

- Road landings – Polish trial coming up
 - Should a nation in Western Europe take the initiative and do a road landing outside Scandinavia?
- Legacy Equipment – NLD
 - Selling and scrapping old F-16 kit, keep it, pre-position it as NATO stocks?



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Questions?