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# 2012梵波羅國際航空展 參觀心得簡報

# 簡報內容

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- 航展簡介
- 無人飛行載具系統 (UAS)
- 光電酬載 (EO/IR、SAR)
- 航空引擎 (渦輪、重油、轉子)
- 飛行表演與實機展示
- 心得

## 航展簡介 (1/2)

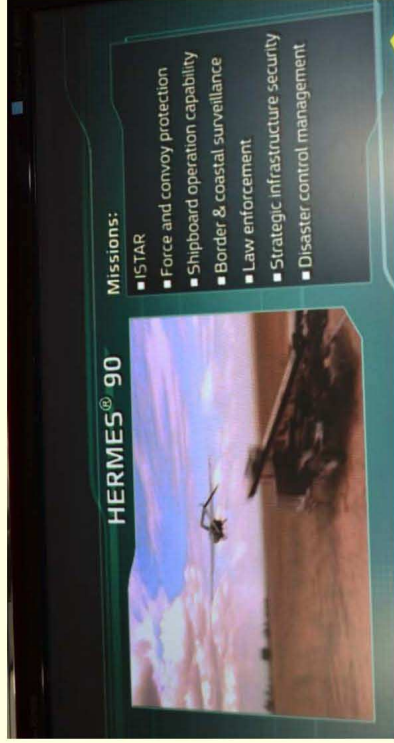
英國大航展，是英國航空展並稱爲世界兩軍航展。本航展包含航空、太空、國防、飛機、太空觀摩、航空技術交流等。航展內容豐富，是航空界的重要盛會。航展期間，將有超過12萬名專業人士和超過470萬名公眾參觀。航展期間，將有超過12萬名專業人士和超過470萬名公眾參觀。航展期間，將有超過12萬名專業人士和超過470萬名公眾參觀。

## 航展簡介 (2/2)

- 2012年的航展於7/9~7/15日為期7天，其中7/9~7/13主要開放給貿易商務人士，7/14~7/15開放一般民眾參觀，我們於7/13日前往參觀，以避開人潮，及能多接觸到較深入的專業人士與技術討論。
- 由於參展內容十分豐富，我們儘量以拍照記錄方式以期能完整收集最多的航展資訊，本簡報主要將所拍攝的照片逐一做說明展示，分享給大家我們赴航展的收穫。

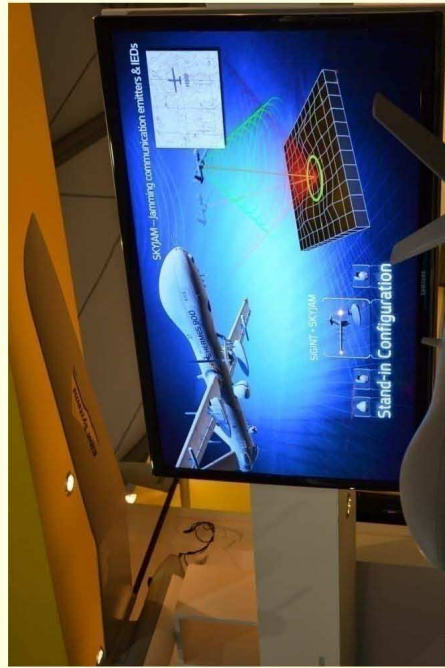
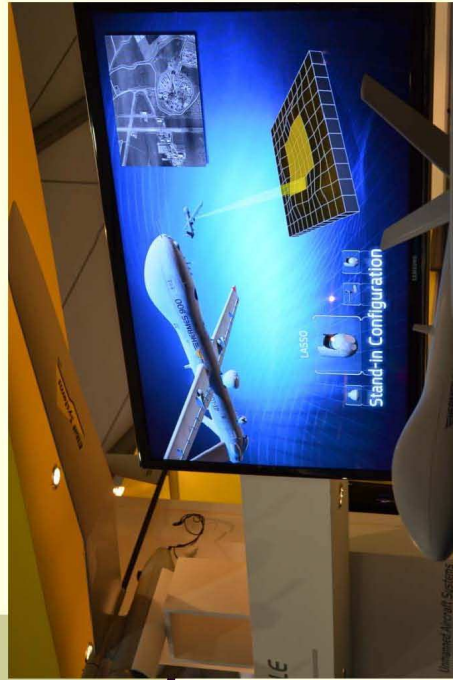
# 無人飛行載具系統 (UAS)

## ■ Elbit Systems 公司的UAV產品HERMES系列

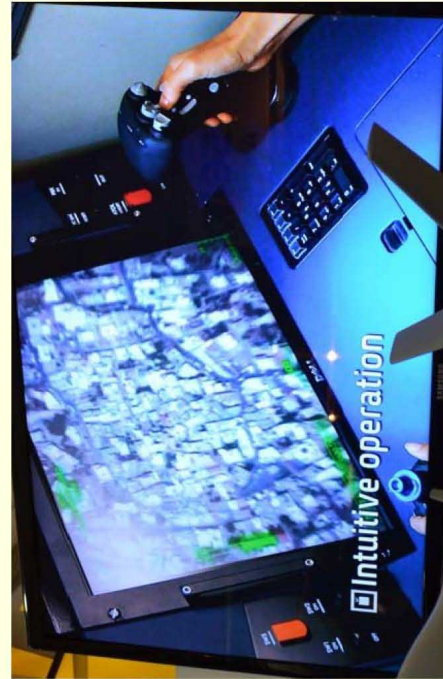




# HERMES 900 UAS



# HERMES 900 UAS





# HERMES 900 UAS



The Hermes 900 is an all weather UAV intended for Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) missions. It features longer endurance, longer range and higher flight altitude as well as increased multi-payload capacity using the same existing mission and support infrastructures available for the Hermes UAV family. The new aircraft incorporates Internal Auto Takeoff and Landing (IATOL) for instrumented and non-instrumented runways. The aircraft inherits the full redundancy and fault tolerant avionics and electronic architecture provided to Hermes 450. The multi-payload capacity available for Hermes 900 encompasses Synthetic Aperture Radar (SAR)/Ground Moving Target Indicator (GMTI) or a mix of Electro-Optical (EO), laser and Infrared (IR) sensors and spotters. Moreover, the aircraft can accommodate payloads to perform Communications Intelligence (COMINT), electronic Intelligence (ELINT) and Electronic Warfare (EW). Its standard avionics equipment includes built-in autonomous emergency procedures, ATC (Air Traffic Control) radio, radio relay, and IFF transponder.



# HERMES 900 UAS

Elbit Systems' Universal Ground Control Station (UGCS) can control up to two Hermes 900s at the same time while a single operator takes care of the air vehicle and its payload. Communications between the air vehicle and UGCS can be done via secure, redundant line-of-sight data-link or beyond line-of-sight satellite communications. Due to its design and its lowest number of operations and maintenance crew requirements, the Hermes 900 UAV is a low life-cycle cost system.

## Performance:

Take-off weight	1,180 kg
Max Payload	350 kg
Endurance	36 hours
Service Ceiling	30,000 ft
Range	unlimited

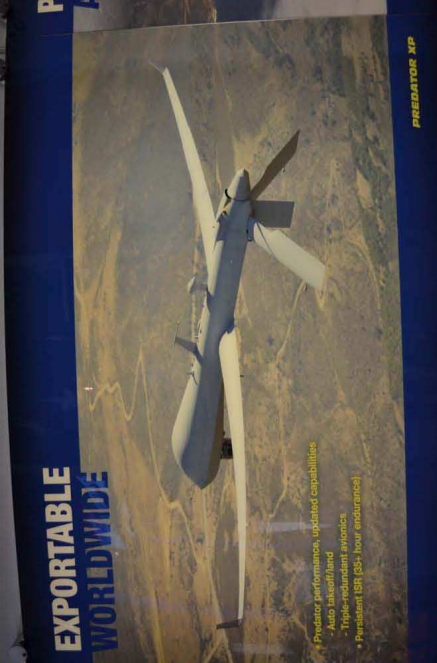
# CEi - Bosch Aerospace Subsidiary

jet-powered target



# Predator

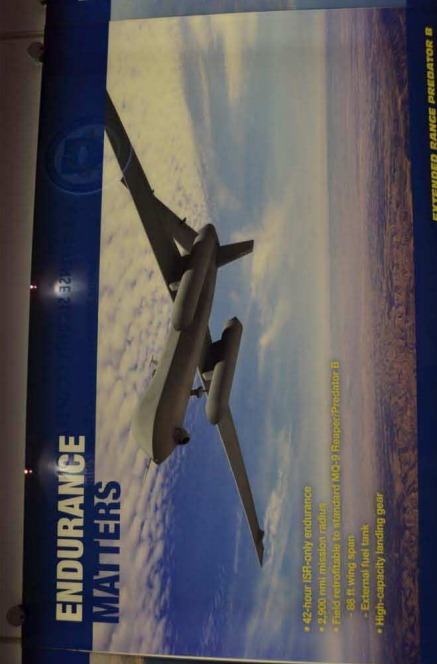
**EXPORTABLE WORLDWIDE**



**PREDATOR XP**

- Proven performance, updated capabilities
- Auto takeoff/land
- Triple-redundant sensors
- Persistent ISR (35+ hour endurance)

**ENDURANCE MATTERS**



**EXTENDED RANGE PREDATOR B**

- 42-hour ISR-only endurance
- 2,500 nmi mission radius
- Pass compatible to standard MQ-9 Reaper/Predator B
- 57,000 lbs payload
- High-capacity landing gear

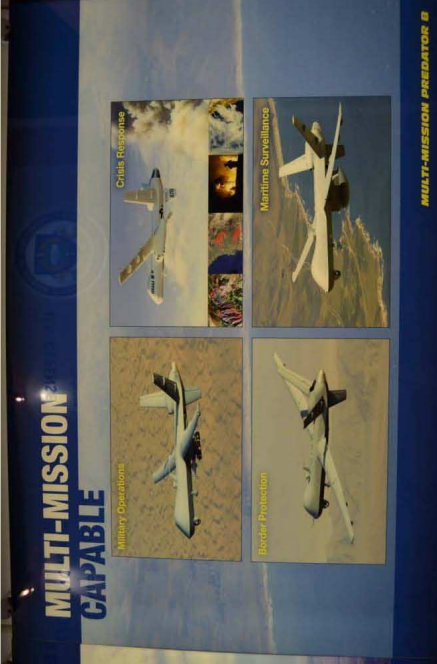
**PROTECTING MARITIME APPROACHES**



**GUARDIAN**

- Detect, track, and identify
- Long-endurance maritime ISR operations
- Illegal drug and immigration interdiction
- Integrated sensors (360° surveillance radar, AIS, EO/IR)
- Operational with U.S. Department of Homeland Security

**MULTI-MISSION CAPABLE**

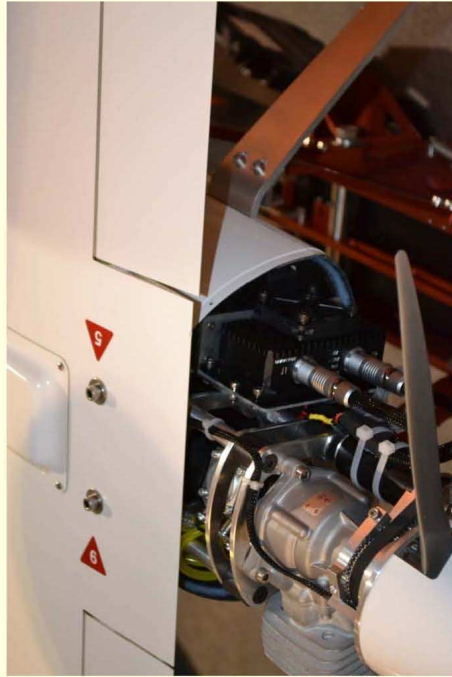


**MULTI-MISSION PREDATOR B**

- Military Operations
- Crisis Response
- Border Protection
- Maritime Surveillance

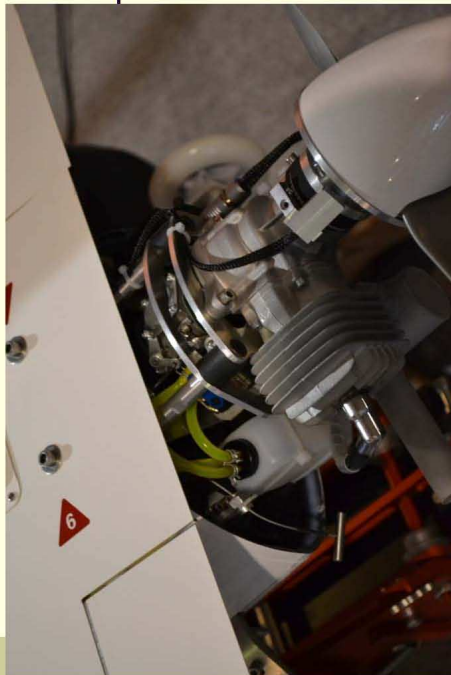
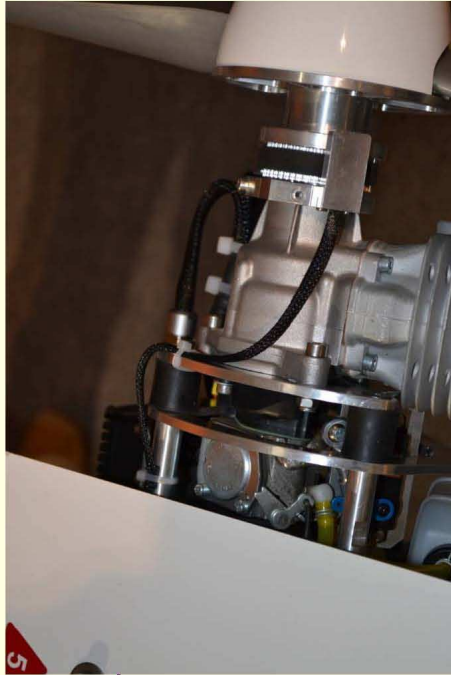


# UAV factory

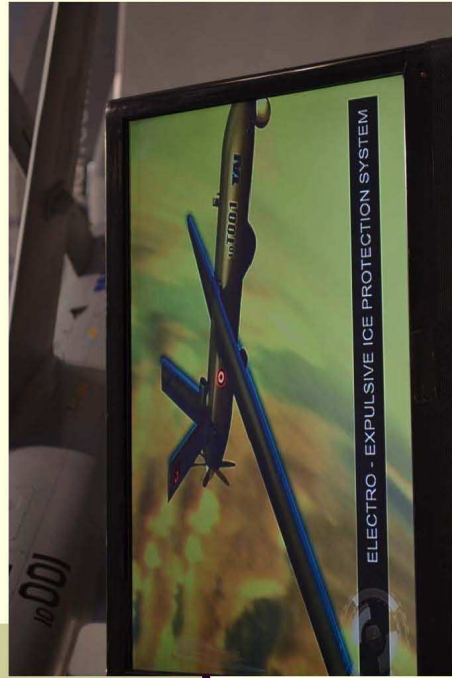




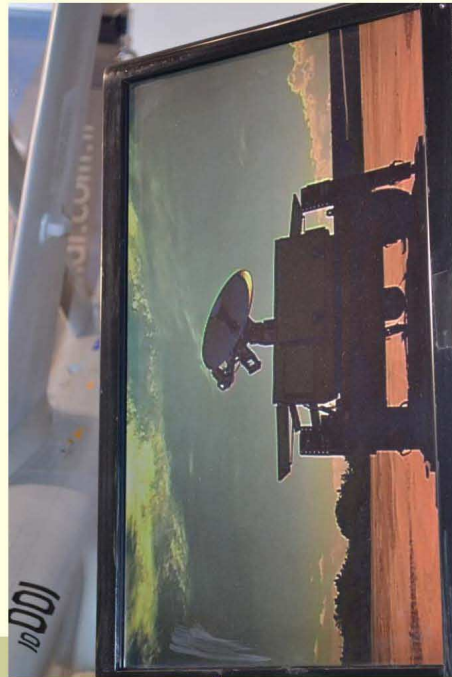
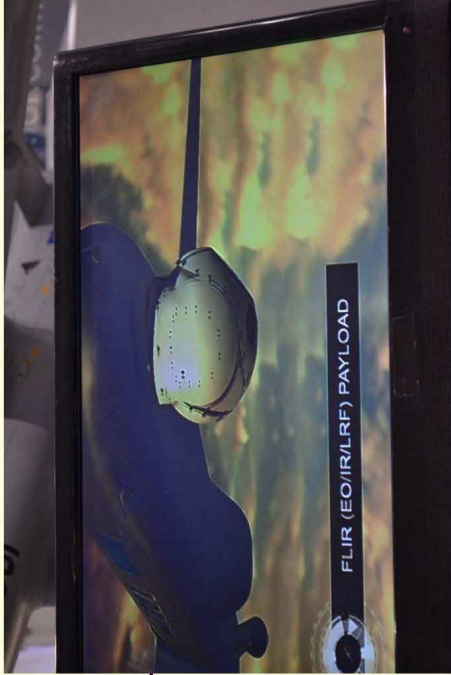
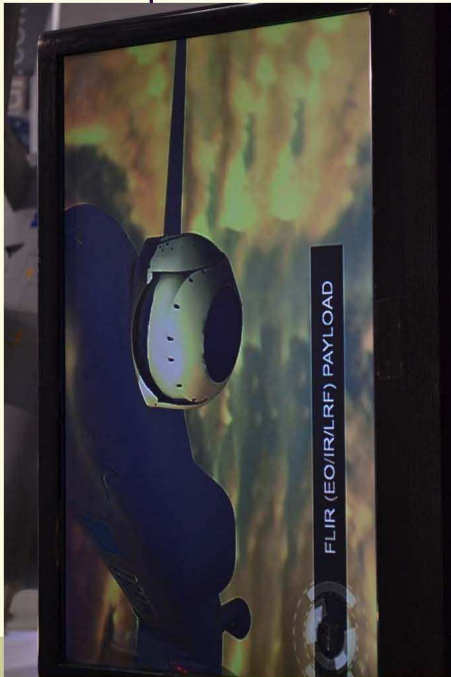
# UAV factory



# TAI Anka

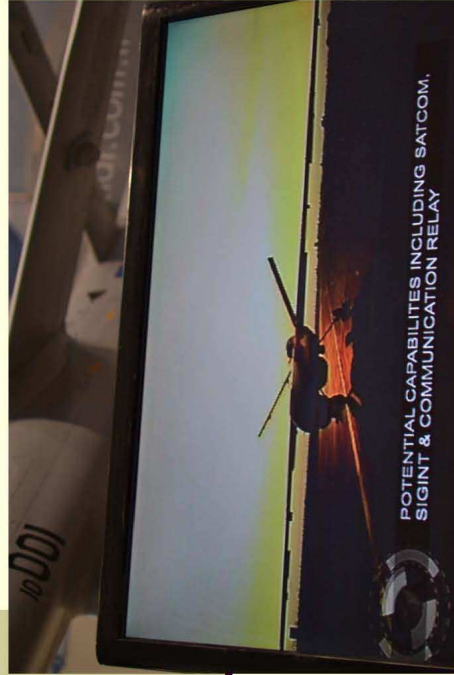
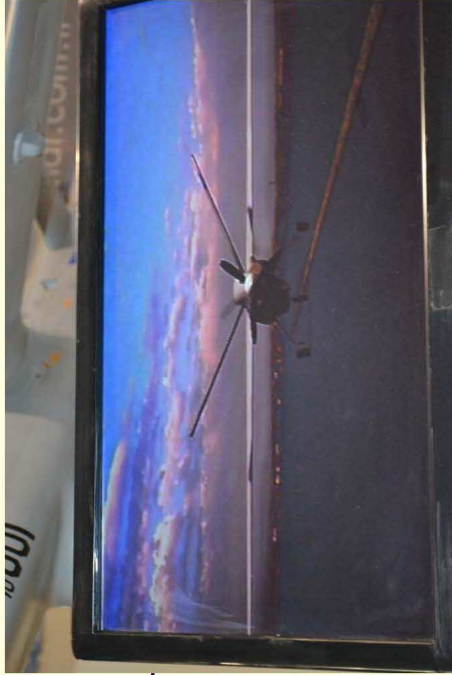


# TAI Anka





# TAI Anka





# TAI Anka

The **TAI Anka** is a family of unmanned aerial vehicles (UAV) developed by Turkish Aerospace Industries for use by the Turkish Air Force. (Anka Eng.translation:phoenix) The Anka-A (TIHA-A) is a surveillance version, while Anka +A (TIHA-B) is a projected unmanned combat aerial vehicle (UCAV). Anka-A is set to be commissioned by the Turkish Air Force in 2012. The name of the UAV Anka is inspired from a mythical flying creature Anka. Israeli officials familiar with UAV systems and who have examined the Anka have stated publicly that it is "of a very advanced design

## General characteristics

**Length:** 26.2 ft(8 m)

**Wingspan:** 56.7 ft (17.3 m)

**Height:** 11.1 ft(3,4 m)

**Wing area:** 146.3 sq ft (13.6 m<sup>2</sup>)

**Max. takeoff weight:** 3527 lb (1600 kg)

**Powerplant:** 1 × Thielert Centurion 2.0 turbocharged four-cylinder engine, 155 hp

## Performance

**Maximum speed:** 135 mph (117 knots, 217 km/h)

**Cruise speed:** 126 mph<sup>[19]</sup> (110 knots, 204 km/h)

**Range:** 3024 mi (4896 km)

**Combat radius:** 124 mi<sup>[20]</sup> (200 km)

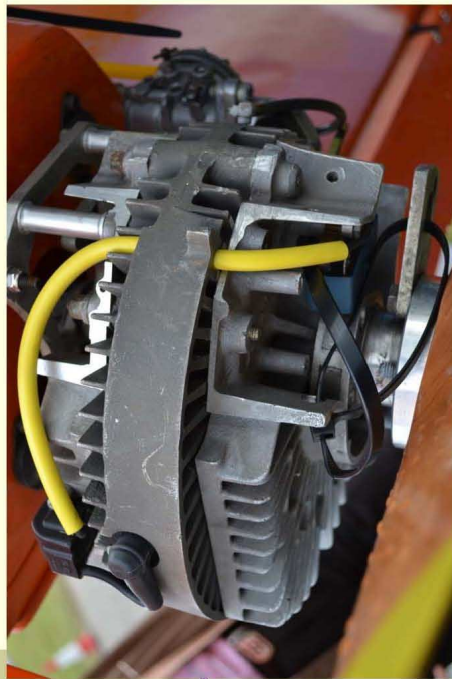
**Endurance:** 24 hours with 200 kg useful payload<sup>[2]</sup>

**Service ceiling:** 30,000 ft (9,144 m)

## Avionics

ASELFLIR-300T, SAR/GMTI, ISAR payload INS/GPS and air data sensor suite system

# Universal Targets Systems Limited (UTSL)







# Universal Targets Systems Limited (UTSL)

## Missile Subsonic Aerial Target MSAT-500 NG

This Aerial Target is part of the low cost high performance MSAT 500 NG AERIAL

### TARGET SYSTEM

The MSAT-500 NG Aerial Target is a reliable training tool assuring cost effective training budgets for air defence gunnery, missile firings and weapon operator training.

Operational over both land and sea, MSAT-500 NG can be utilised to simulate the threat of attacking enemy aircraft, missiles and RPVs/drones.

Universal Targets Systems Limited (UTSL) specialise in the design and manufacture of aerial targets, launch systems, command and control systems and all ancillary equipment used in relation to Remotely Piloted Vehicles (RPVs) and Air Defence training. One of our main products, aerial target drones, are used for operations over land and sea and provide a cost effective method of training personnel in familiarisation and use of Air Defence weapon systems. Unmanned Air Vehicles (UAV's) are also manufactured by UTSL for battlefield 'over the hill' surveillance, and civilian applications.





# Tekever AR5 UAS



# Tekever AR5 UAS



# 光電酬載 (EO/IR、SAR)





# 光電酬載 (EO/IR、SAR)





# 光電酬載 (EO/IR、SAR)



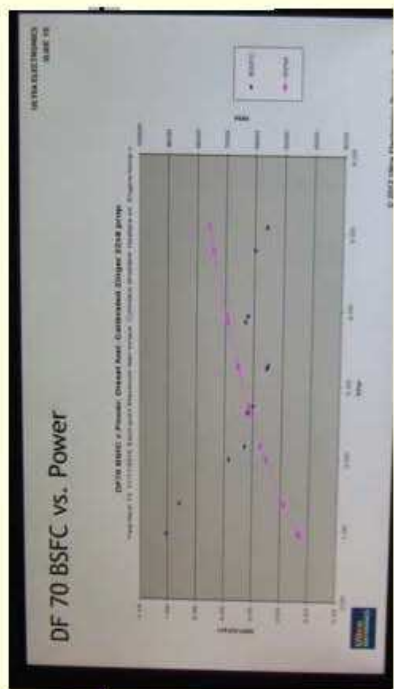
光電酬載 (EO/IR、SAR)



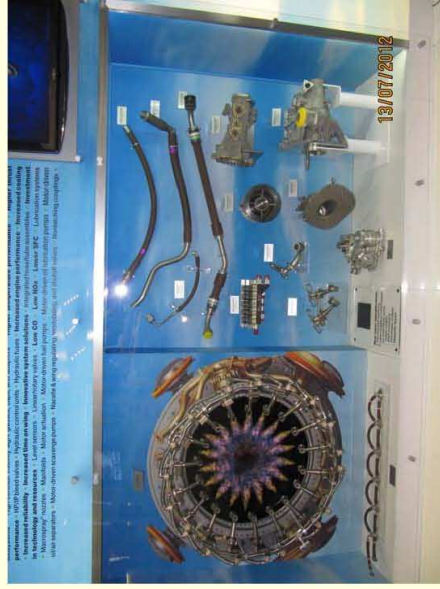




# Ultra DF 70 Heave fuel engine



# Safran 渦輪引擎

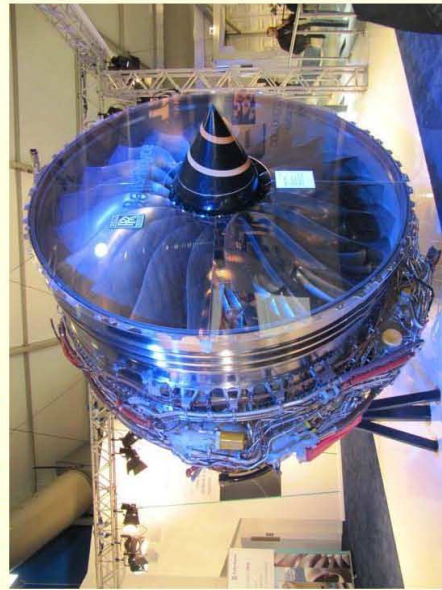
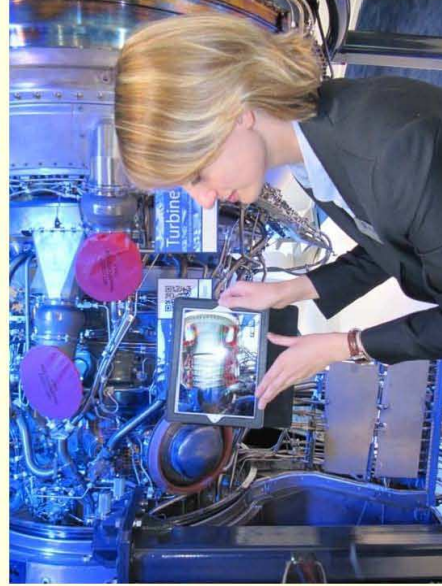
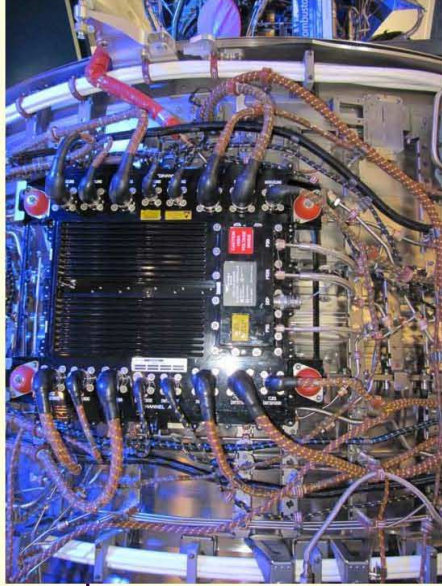


# TEI渦輪扇引擎





# Rolls-Royce 渦輪引擎



# 飛行表演與實機展示

















## 心得

■ 本次參觀2012 FIA針對UAV及EO/IR部分收集到許多資料，也獲得許多系統概念相關知識，有些廠商以UAS (Unmanned Aircraft System) 來稱呼無人飛機，是以系統功能層級來思考，因為UAS整合了，多項系統功能，包含：EO/IR、SAR、IATOL、C4ISR、Electronic Warfare等多項系統。航展參展廠商Elbit Systems公司的Hermes UAS完整的展現了系統的整合運用。

■ 本次參展廠商中，除了歐美已具規模的大公司之外，南韓、土耳其、墨西哥等國也積極投入參展。南韓展示了T-50教練機的製造能量，在文宣的廣告上也準備的很用心，在動態飛行展示部分亦安排T-50進行飛行表演，相當程度的提升了南韓的航空工業的國際能見度。土耳其主要參展的是由TAI公司所設計製作無人靶機，該國的文宣上亦展示了F-16的檢修能量與部份機體的代工製造能量。墨西哥以無人飛機為展示項目，積極參與國際航展。本院若能結合國內相關航空產業，投入未來的重要國際航展，應能提昇國內航空產業產值及帶動國家航空技術的發展。

展場中有規劃廠商獨立的展示空間，能進行深入的技術規格及採購研討，欲進入參觀是需要受廠商邀請，這個部份因我方屬軍方研發機關的考量，較難完善安排。

航展會場中可以見到許多學校安排學生來參觀，包含國小～大學各階段的學生，可以感受到歐洲地區的教育深入航空技術領域人才的栽培與重視。當參觀學生有疑問向參展廠商詢問時，亦可見到回答的專業人員耐心及認真的詳細示範說明，雙方認真的互動過程讓我們感到十分敬佩。