

# VSAT 衛星通訊系統

## 衛星通訊概述

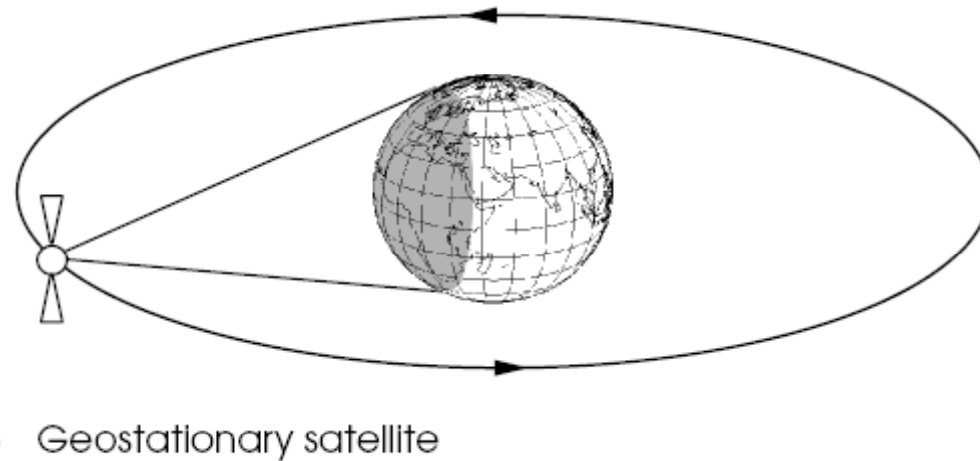


- ✓ 通訊衛星位於地表以上35,000Km外,扮演長程通訊之訊號中繼功能
- ✓ *Geosynchronous* 軌道與*Geostationary* 軌道使通訊衛星能維持於天空之定點位置
- ✓ 同理,其他軌道亦能使用;但須配合其他複雜且昂貴之衛星追蹤系統以保持地面站天線能精確指向特定軌道之衛星

Note : 1. Geostationary Orbit : A satellite in geostationary orbit (often called GEO) is synchronized with the rotation of the earth, and rotates in the same direction. This orbit is close to the equatorial plane of the earth, which means that the inclination is very close to zero.  
2. Geosynchronous Orbit : A geosynchronous orbit has a period equal to the time for one complete revolution of the earth. The orbit may be inclined at any angle to the equatorial plane.

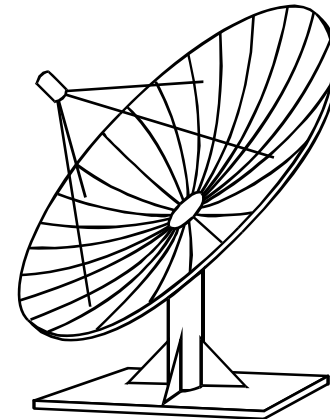
## VSAT系統概述

- ✓ 目前VSAT衛星網路普遍使用同步衛星(*Geostationary*)資源,通訊衛星位於赤道平面地表以上35,786Km外之*Geostationary*軌道上
- ✓ 衛星載波經上/下鏈傳輸所造成之傳輸延遲約250mS
  - Hop Delay: 指地面站對地面站間傳輸延遲



## 衛星通訊概述

- ✓ 通訊衛星於同步軌道上緊密地作定點排列
  - 高使用率軌道區域: 2度為間隔
  - 低使用率軌道區域: 3 至 4 度為間隔
- ✓ 衛星地面站必須能夠區別軌道上不同之衛星訊號接收



## 衛星通訊概述

- ✓ 通訊衛星之主要元件為：上鏈(Up-link)接收器與下鏈(Down-link)發射器-合稱衛星轉頻器(Transponder)
  - 地面站上鏈頻率經衛星轉頻器轉換為下鏈頻率,故上/下鏈訊號並不互相干擾
- ✓ 通訊衛星一般設置多個轉頻器並且使用不同頻段
- ✓ 衛星轉頻最常見頻段:
  - C-Band
  - Ku-Band

## 衛星通訊概述

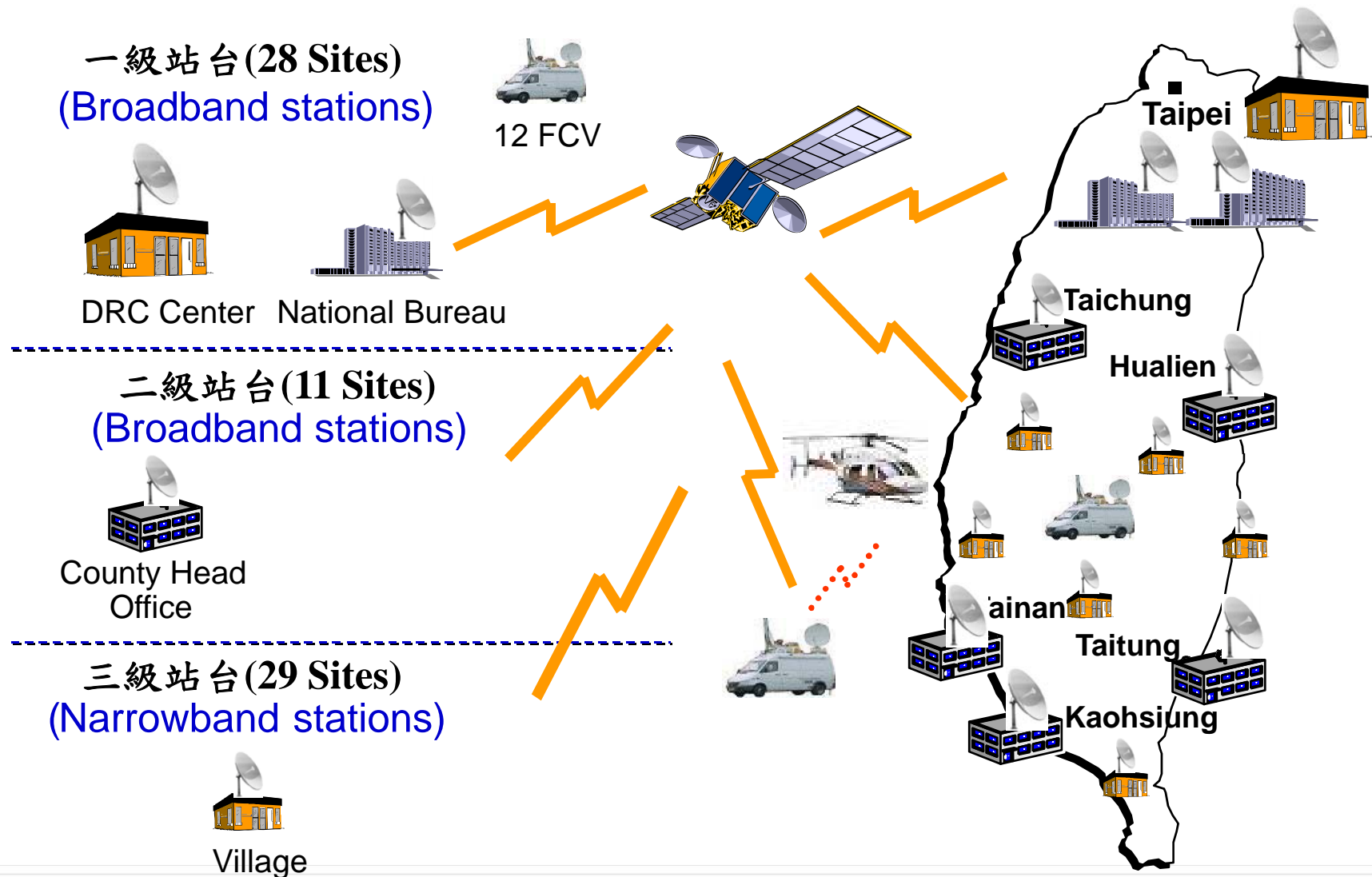
### ✓ 主要通訊衛星頻帶 (GHz)

Frequency Band	Earth to Space (Up-link)	Space to Earth (Down-link)
C	5.925 - 6.425	3.700 - 4.200
Ku (North America)	14.000 - 14.500	11.700 - 12.200
Ku (Europe)	14.000 - 14.500	12.250 - 12.750
Ku (Australia, Europe)	14.000 - 14.500	10.950 - 11.700

## 本案使用之衛星

- ✓ 主要通訊衛星 - 中新一號
- ✓ 備援通訊衛星 - *Agila-2*

# 消防署VSAT系統架構



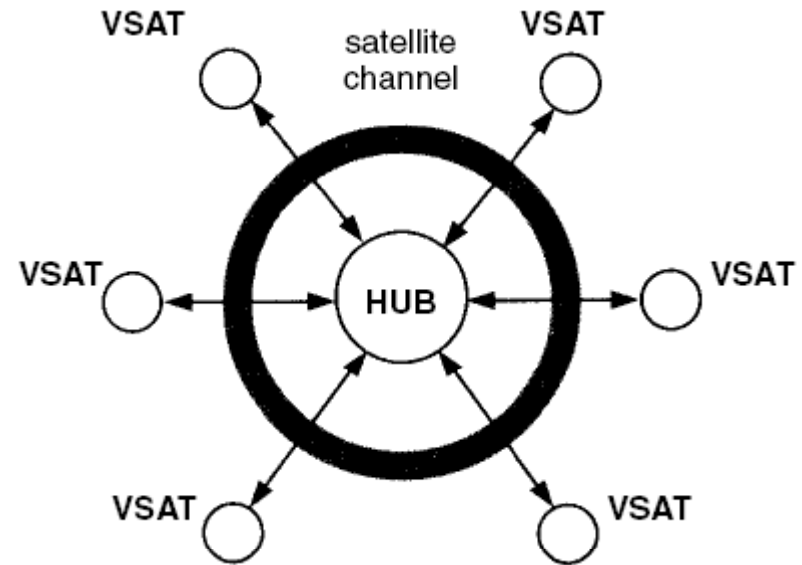
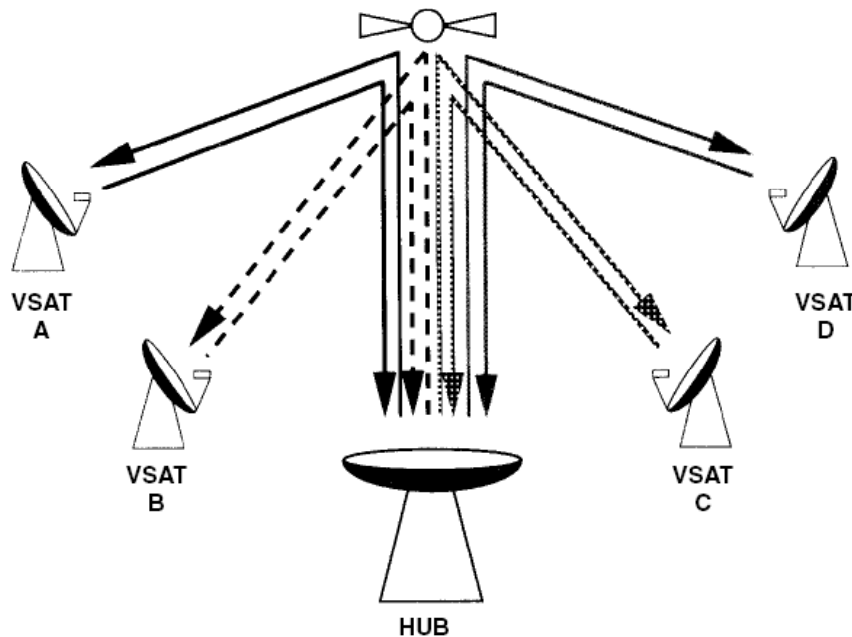


# VSAT系統概述

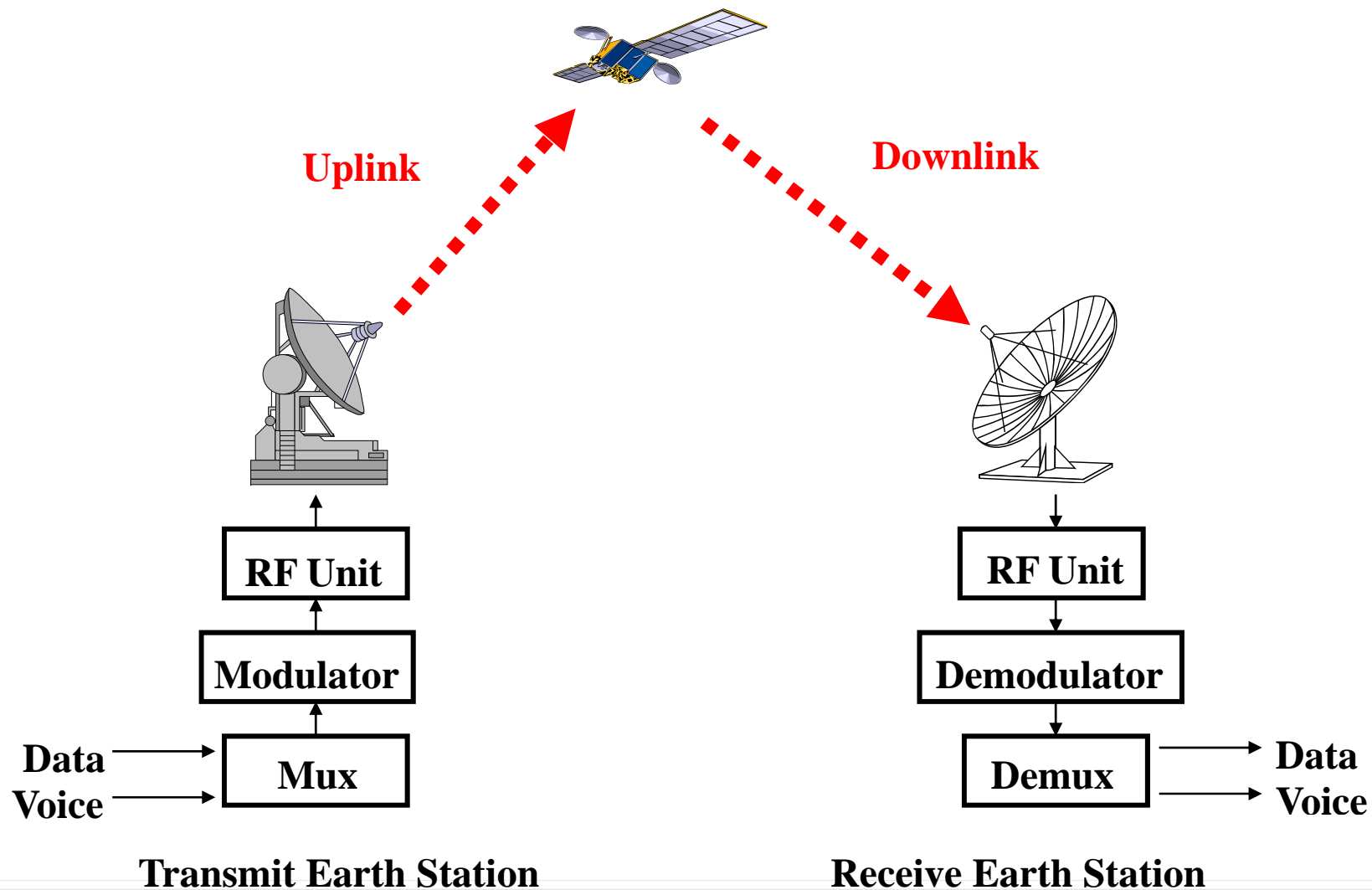
## ✓ VSAT 星狀(Star)網路系統

The solution then is to install in the network a station larger than a VSAT, called the *Hub*. The hub station has a larger antenna size than that of a VSAT, say 4 m to 11 m, resulting in a higher gain than that of a typical VSAT antenna, and is equipped with a more powerful transmitter.

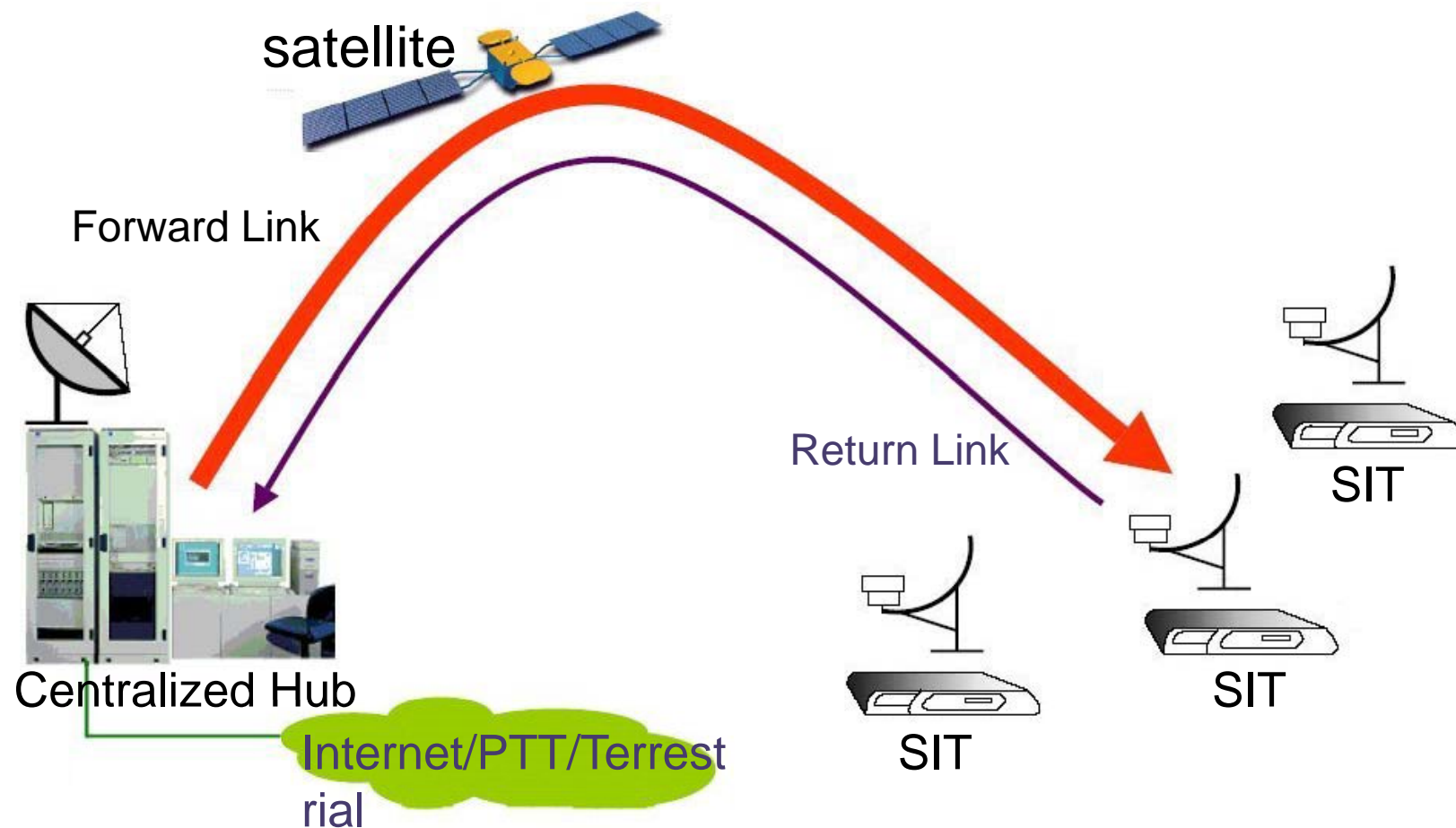
As a result of its improved capability, the hub station is able to receive adequately all carriers transmitted by the VSATs, and to convey the desired information to all VSATs by means of its own transmitted carriers.



# 衛星上鏈與下鏈設備



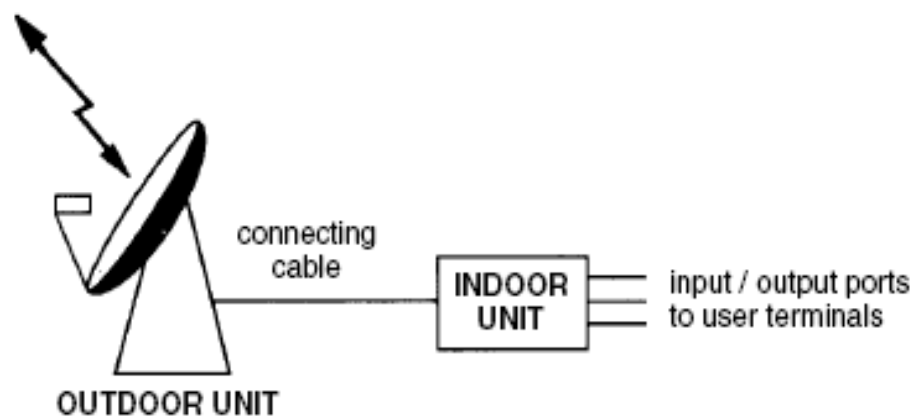
# 轉送鏈路與返回鏈路



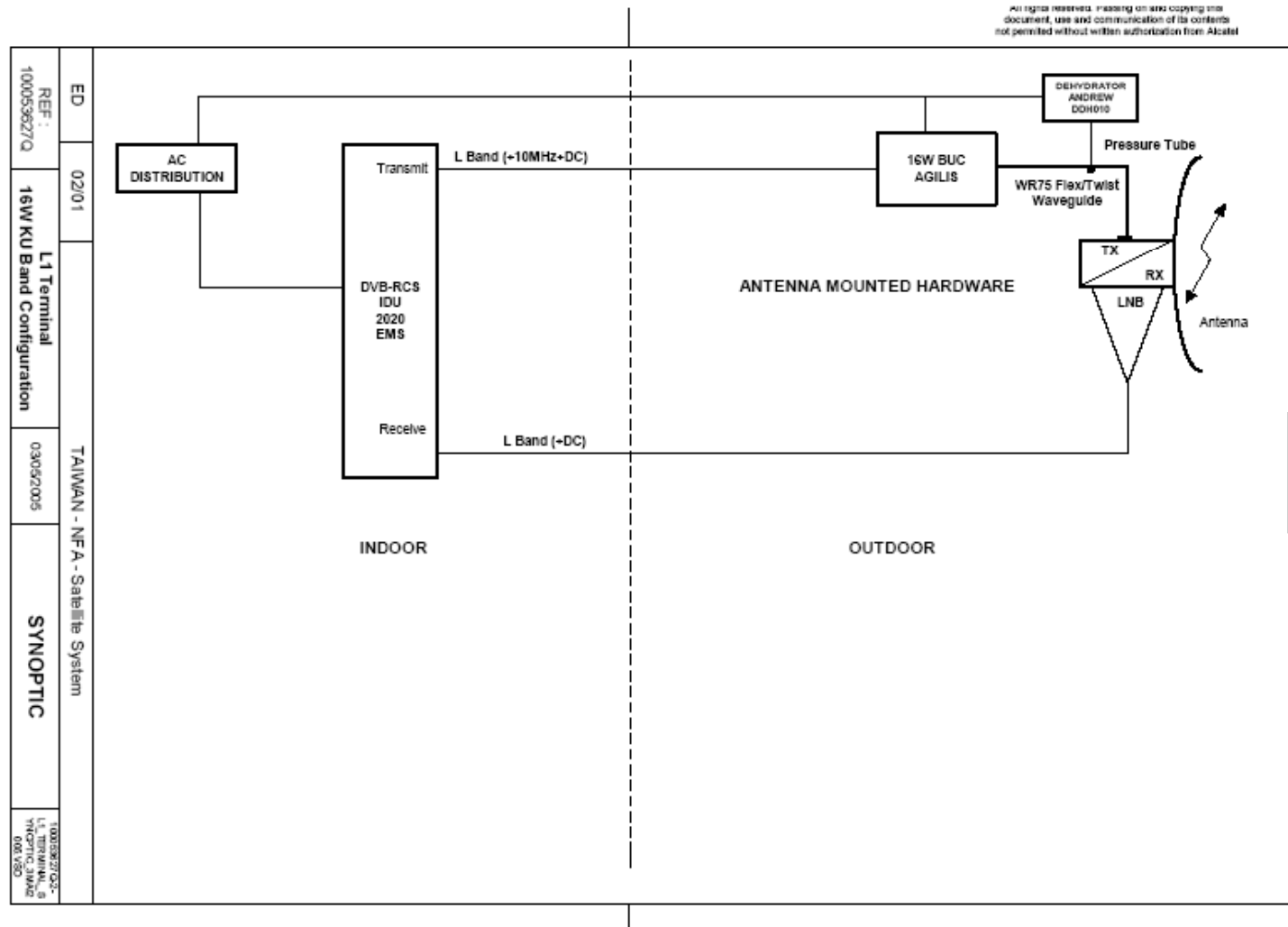
# VSAT 站台設備

✓ *ODU (Out Door Unit)*

✓ *IDU (In Door Unit)*



# 站台衛星設備概要圖



## 衛星上鏈與下鏈設備

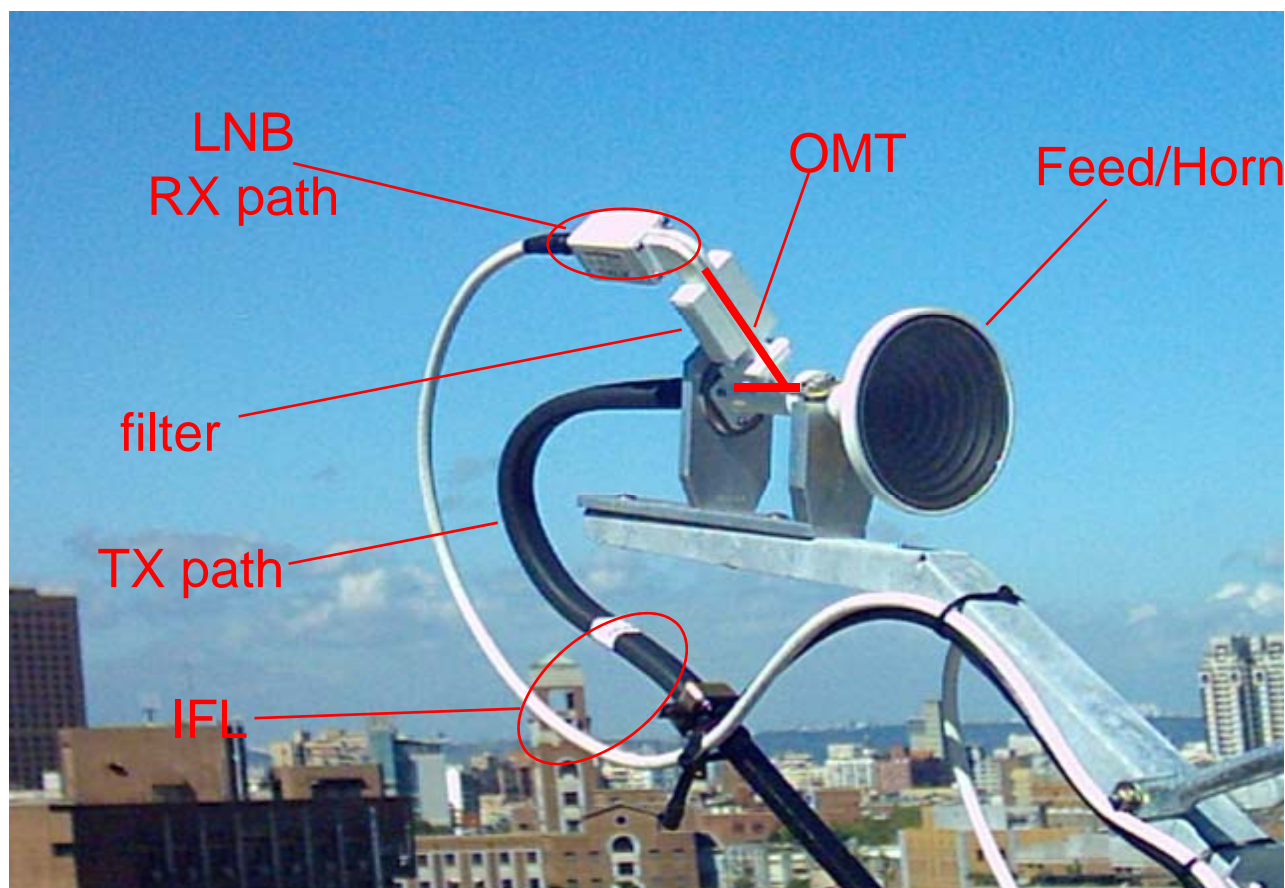
### ✓ 戶外單元 1.8米碟型天線

1.8米碟型天線



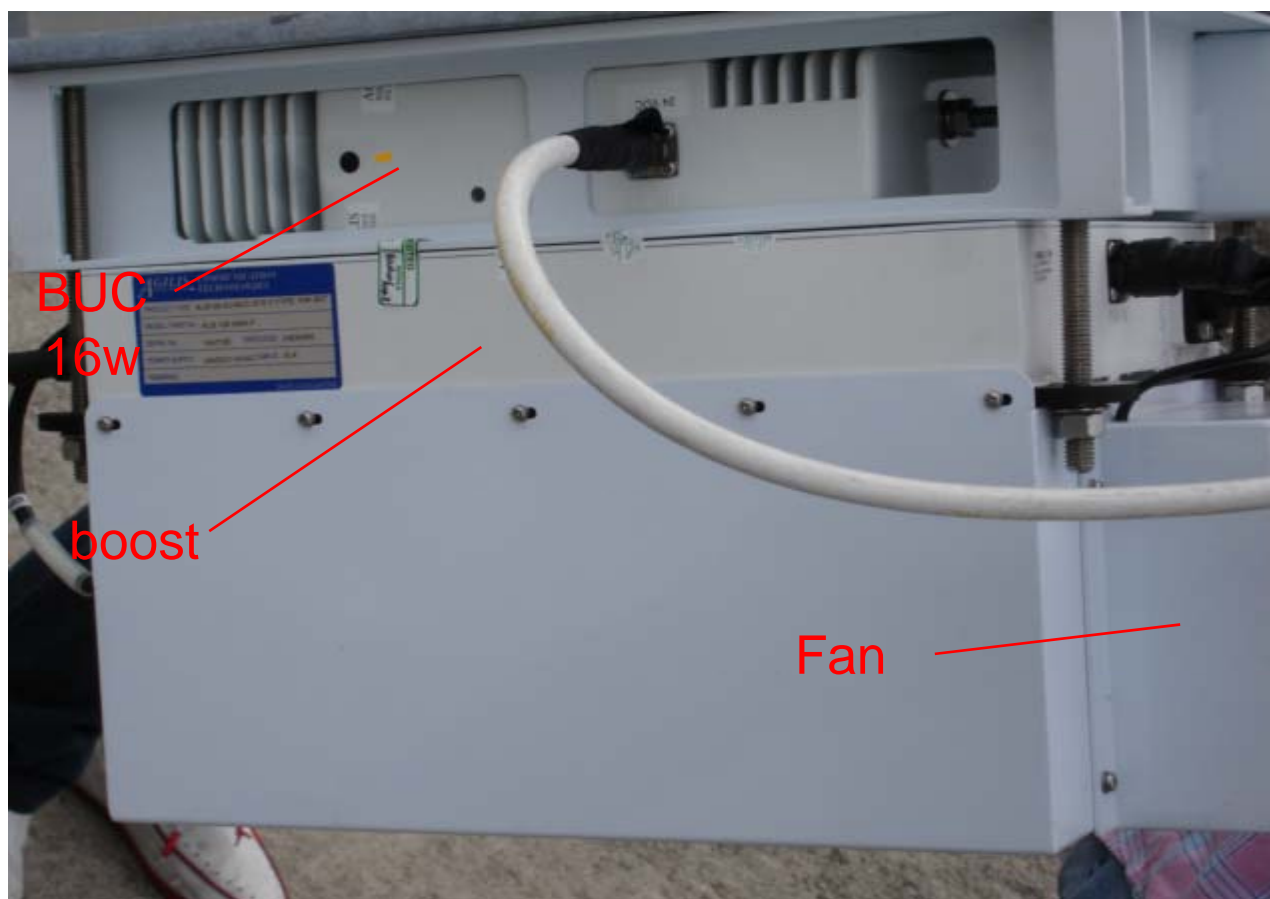
## 衛星上鏈與下鏈設備

### ✓ 戶外單元 (ODU, Out Door Unit) – LNB & OMT



## 衛星上鏈與下鏈設備

✓ 戶外單元 (ODU, Out Door Unit) – L1 站台 16W BUC





## 衛星上鏈與下鏈設備

- ✓ 戶外單元 (ODU, Out Door Unit) – L2 站台 8W BUC



## 衛星上鏈與下鏈設備

- ✓ 戶外單元 (ODU, Out Door Unit) – L3 站台 4W BUC



## 衛星上鏈與下鏈設備

### ✓ 室內單元 (IDU, In Door Unit)

#### □ Satellite Modem

- ODU inter-connection by IFL (Inter-Facility Link)
- CPE inter-connection (Router)



## 觀察系統運作情形

✓ 觀察燈號

IDU

BUC

✓ 登入IDU監視網頁

## 觀察燈號 - IDU

- ✓ 正常燈號應為：POWER, READY, 衛星RX, 衛星TX綠色恆量。網路RX, 網路TX偶爾閃爍。



## 觀察燈號 - BUC (4W, 8W)

✓ 正常燈號應為：綠色恆量。

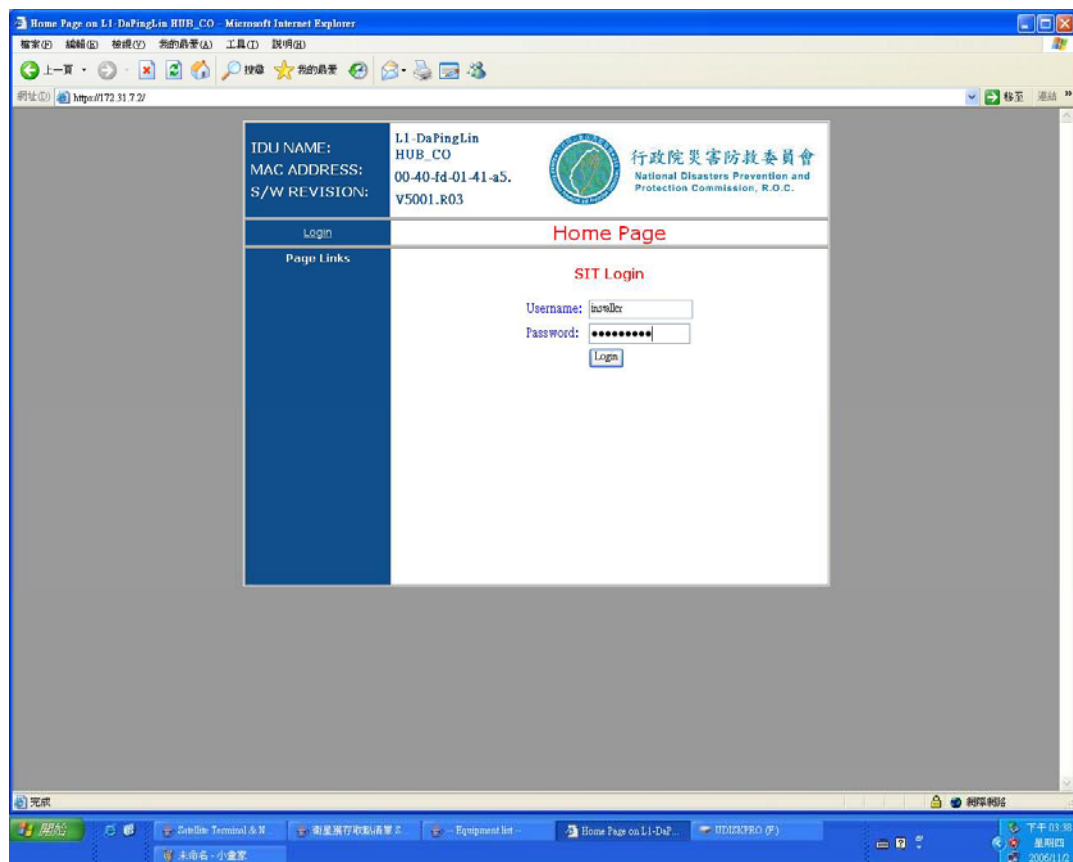


## 觀察燈號 - BUC (16W)

✓ 正常燈號應為：綠色恆量。



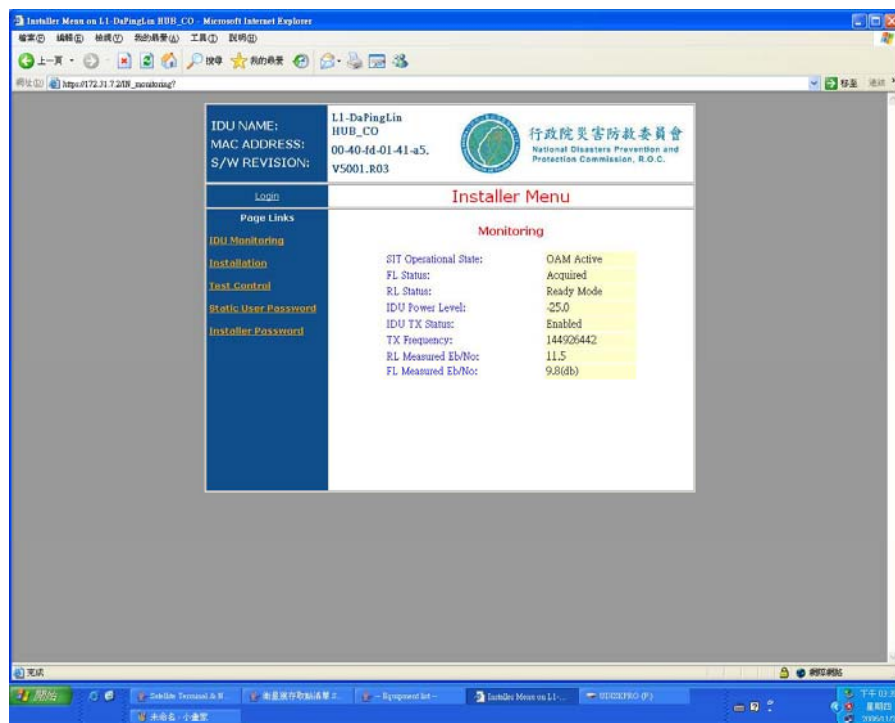
# 登入IDU監視網頁



- ✓ 由機架內之電腦以網路瀏覽器連線至IDU。
- ✓ 登入帳號：\*\*\*\*\*
- ✓ 登入密碼：\*\*\*\*\*



# IDU監視網頁重要數據



✓ 選擇IDU Monitoring，出現左邊畫面。

✓ 重要數據

MAC ADDRESS

FL Status : Acquired

RL Status : Ready Mode

IDU Power Level

RL Measured Eb/No : 接近12

FL Measured Eb/No : 7.5 ~ 12

## IDU 電源開關位置



IDU 電源開關位於正後方

# VSAT衛星系統

## 問題與討論