Agenda Item D-2

39 th Argos Operations Committee meeting
Prepared by CNES
June 7th, 2005

Status of Argos instruments

1- Argos 1 instruments :

NOAA-H satellite has been deactivated on June 16th, 2004 after 16 years in orbit. Argos instrument was working perfectly when satellite has been decommissioned.

The Argos instrument on-board NOAA-J continues to function properly . It has no redundant receiver.

Argos instrument on-board NOAA-D has spent 14 years in orbit. It is part of the initial series TN and NOAA-A to G and was manufactured a long time ago. This instrument provides only recorded data (no real time data).

Both payloads are fully operational.

2- Argos 2 instruments:

Argos instruments onboard NOAA-K, L, M and N are second generation instruments. They have an increased receiving bandwidth (80 kHz instead of 24 kHz) and an increased telemetry bit rate of 2560 b/s.

The Argos-2 system capacity is considered to be reached when the probability to receive a single message is 50% . That corresponds to a system occupancy from the satellite = 11 Erlang (computed with 8 processing units over the 80 kHz bandwidth).

Currently, a mean capacity = 2 Erlang is used by the Argos system with peaks = 6 to 7 Erlang above the most crowded areas (South America, South-East Asia, West-Europe).

The last Argos-2 instrument has been launched with NOAA-N on May 20th,2005 from the Base of US Air Force in Vandenberg (CA). The instrument has been switched-on on May 27th, and the in-orbit testing has been performed over 3 weeks. The instrument works properly with the exception of the processing unit DRU#8.

This DRU#8 presents an anomaly which has been confirmed by CNES and CLS :

- for the beacons having an ID of 20 bits, the first byte of the sensor word is systematically missing and one extra byte with random bits is added at the end of the sensor words, before the Doppler word (the Doppler word seems correct).

- for the beacons having an ID of 28 bits (that concerns a large part of the beacon population), the missing byte concerns the last 8 bits of this ID and the messages have to be discarded at ground segment level.

The decision has been taken to switch-off definitely this DRU (after a preliminary switch-off and on). The impact of having 7 DRUs instead of 8 is not deemed important, furthermore the DRU#8, being the last, is the DRU which processes the smallest number of messages (roughly 6% in average). Even if some of these messages could be affected and then processed by other DRUs, it is expected to loss a few percent of messages over the most crowded areas (as Perou or Indonesia).

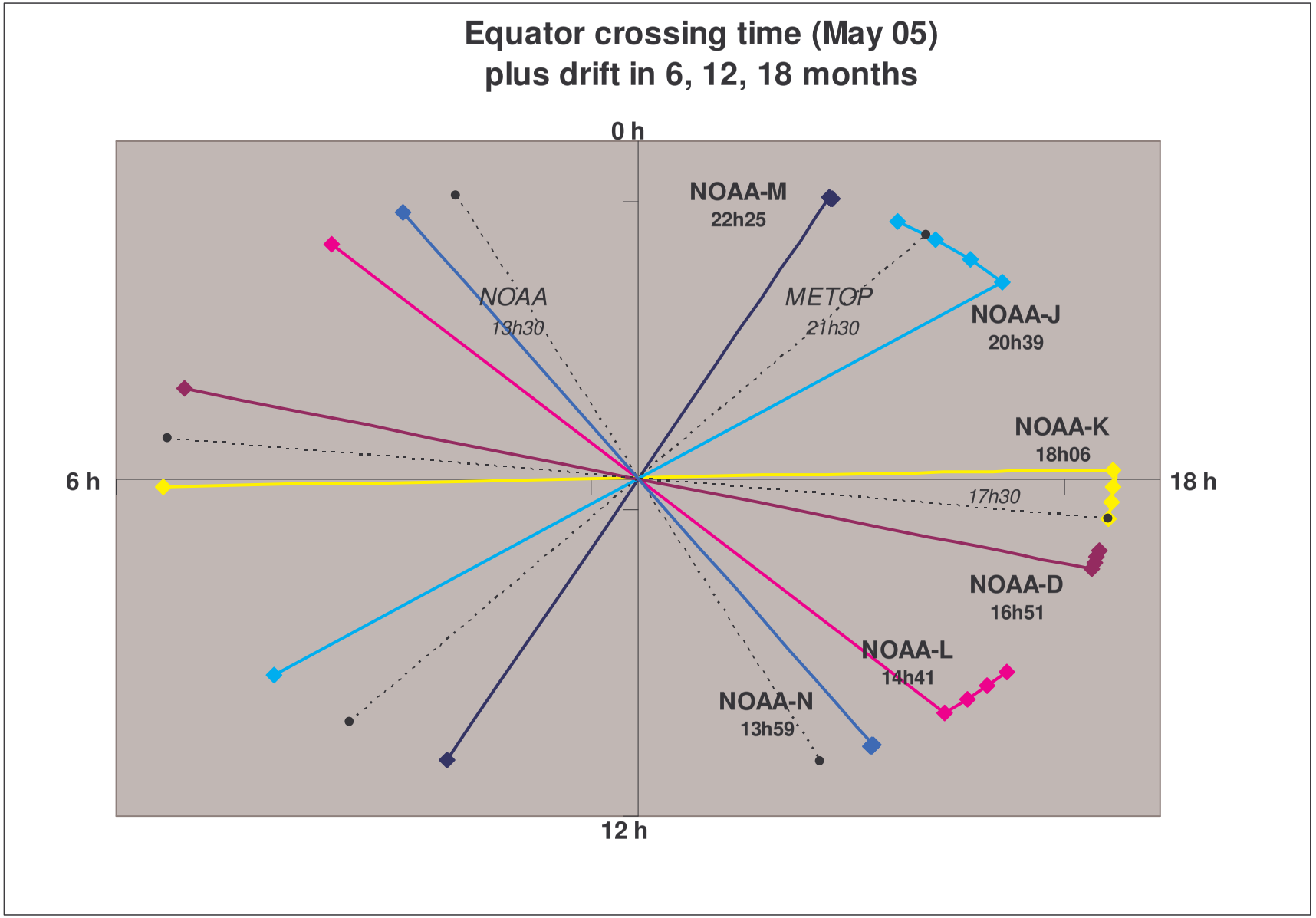
There are now six operational payloads on orbit. Four of them are Argos 2. With the failure of Argos-Next on ADEOS II in October 2003, the downlink service is not operational. It must be waited until 2006 to recover this downlink service with the new Argos-3 instruments.

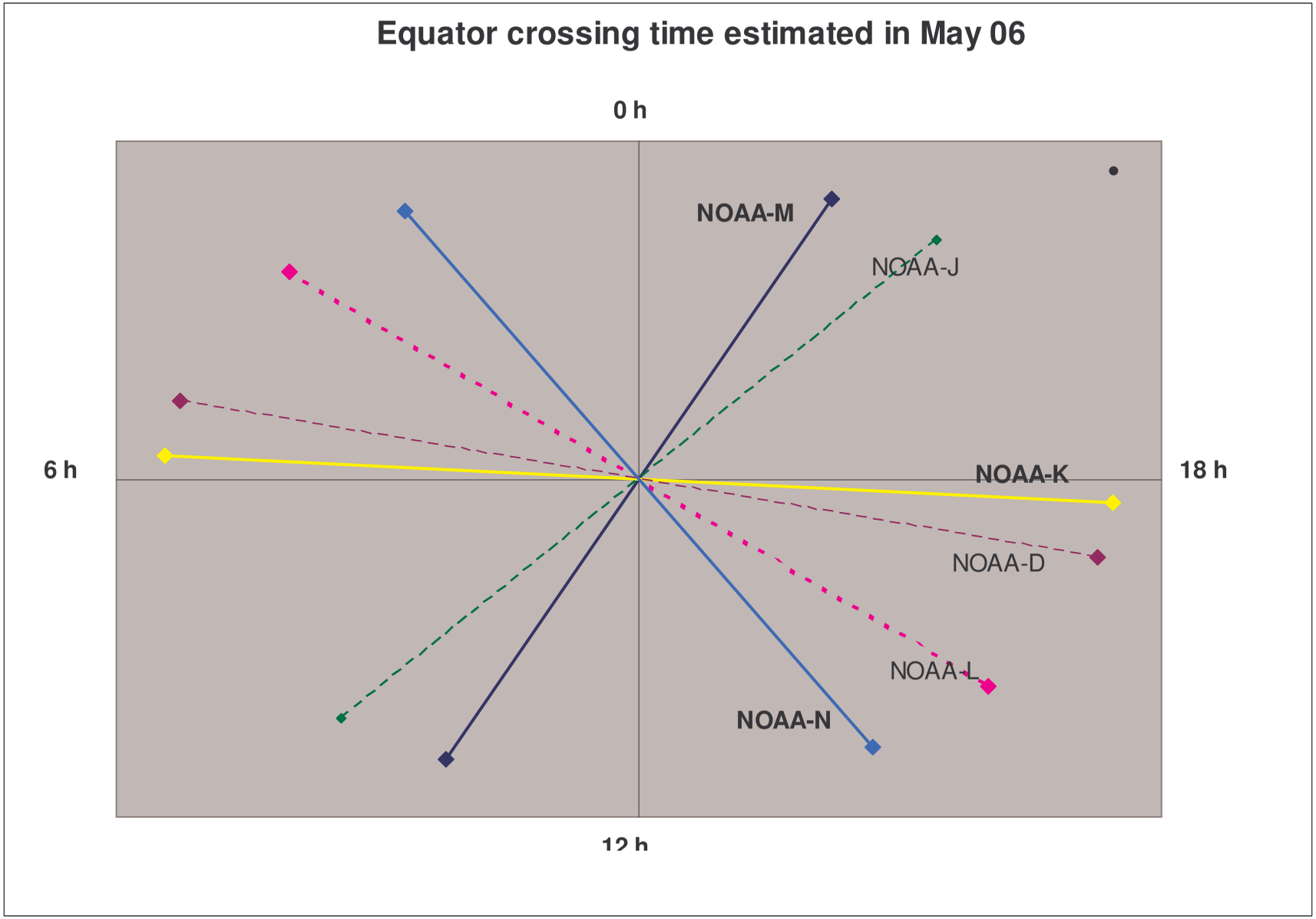
3- Orbital planes:

The figure below shows the repartition of the orbital planes of the six satellites as of May 2005 (see figure 1).

Currently, with the 6 satellites, the repartition is really optimal with about 2 hours between two consecutive plans and the waiting time for any beacon on the surface of the earth is minimised.

Within 18 months, the orbital planes of NOAA-D and NOAA-J will have drifted and the NOAA-D plane should be close of the NOAA-K one. There is the same situation with the NOAA-J plan that should be close of the NOAA-M one. The Argos Service should be a bit degraded but should stay performing as far as the four NOAA satellites embarking the Argos-2 instruments are still operational (see figure 2)


Equator crossing time (May 05)
plus drift in 6, 12, 18 months
0 h
6 h
18 h
12 h
NOAA-M
22h25
NOAA
13h30
METOP
21h30
NOAA-J
20h39
NOAA-K
18h06
17h30
NOAA-D
16h51
NOAA-L
14h41
NOAA-N
13h59


Equator crossing time estimated in May 06
0 h
6 h
18 h
12 h
NOAA-M
NOAA-J
NOAA-K
NOAA-D
NOAA-L
NOAA-N