



RAL ATSR PLS Report to 18th ATSR Core Group Meeting

Covering the period 1st January 2000 until 31st March 2000

Prepared by Dr. C. T. Mutlow and Mr. B. J. Maddison

1. PROGRESS SUMMARY

Good progress has been maintained throughout the period, and a number of milestones achieved.

The ABF system has cleared the backlog of files and is currently operating trouble free. The quality assurance exercise of comparing the new RAL coefficients with the current operational coefficients generated by Dr. Chris Merchant has shown differences which are currently being investigated. The validation analysis of the SISTeR campaign data is nearing completion. Distribution of the ATSR-2/ buoy intercomparison data set is underway.

2. INSTRUMENT STATUS

2.1 ATSR-1 STATUS

ATSR-1 during reactivation in January was shown to be in good health, 9 years after launch. However in early March following platform problems ESA declared the ERS-1 flight mission to be at an end.

2.2 ATSR-2 STATUS

ATSR-2 has operated throughout this period, except for two shutdowns, which were both unconnected with the instrument. There followed problems associated with the initialisation of on-board instrument software. ATSR-2 is currently operating nominally.

3. REPORTS ON INDIVIDUAL WORK PACKAGES

3.1 WP 1000 SCIENCE EXPLOITATION

3.1.1 WP 1100 Scientific Planning and Project Management

Regular meetings have been held of the ATSR PLS Project team to progress all aspects of the ATSR Post Lunch Support Programme.

3.1.2 WP 1200 Scientific Support

Previous reports to the ACG have detailed the careful work that has already been carried out to prepare for the generation of the new coefficients for ATSR-1 and ATSR-2, and to ensure full traceability in the software and methods used. During the last quarter these tools have been applied in a quality assurance exercise to compare new RAL generated coefficients with the current operational coefficients generated by Dr. Chris Merchant. Convergence of these two sets of coefficients has not yet been achieved. There are still some discrepancies that have to be resolved, but which are currently thought to come from differences in the treatment of tropospheric aerosol. This exercise has already revealed a number of incon-

sistencies and resulted in improvements of coefficients; a full report on this will be presented at the ACG meeting.

The project team supported a very successful meeting of an ad-hoc group to discuss new land and cloud products, and an ATSR Product Control Board Meeting. The minutes of these meetings are available to the ACG and a more detailed verbal report of the meetings will be given at the ACG.

Two anomalies in the ATSR-2 instrument have come to light during the last quarter which are described in detail in other sections of the report. These anomalies have required science support effort to investigate the ATSR data sets and provide key data required by the operations team.

Work on updating of the cloud algorithms continues, and the paper on the current cloud algorithm will be published shortly in the JAOT. Some new deficiencies in the cloud scheme have been identified through the data analysis that is being undertaken for recent tropical Pacific validation campaigns, these are now being addressed. Two new cloud schemes have recently been published, these are the AVHRR CLAVR-1 scheme and the new MODIS scheme. These new schemes are being examined to see if any of their methods can be used to improve the ATSR-2 algorithms. It is hoped that this work can be speeded up through a collaboration with the Division of Atmospheric Research from CSIRO Australia, as they are already in the process of implementing the CLAVR-1 algorithm in their generic satellite data processing software package. More detail of the progress on this area of the programme will be provided at a future ACG meeting once there are firm developments to report.

Good progress has been made on the CD-ROM, a short presentation will be made at the ACG on the current status and the schedule for the release of CD ROM's.

No progress has been made on the investigation of the sunglint effects in the 10.8 and 12 μ m channels; RAL are currently investigating employing Albin Zavody for a few weeks to address the issue further.

The problems with ATSR-2 geolocation accuracy were highlighted by the ad-hoc land group, and the recent changes to mono-gyro piloting on ERS-2 will exacerbate these problems. It is clear that the project team will need to be pay some attention to this issue over the next few months.

3.1.3 WP 1300 Underpinning Physics

Work continues on the ongoing items listed in Table 2 of the attached summary. The progress on these activities remains good and will be reported to future ACG meeting. The major activities are the updating of the ATSR-1 coefficients and the Cloud Algorithm.

A verbal summary of the ATSR-1 coefficient work will be given at the ACG.

3.1.4 WP 1400 Management Interfaces

The Project Scientist has maintained regular management level contact with ESA counterparts at ESA-HQ, ESTEC, ESRIN and ESOC.

3.1.5 WP 1500 Promotion

The major promotion activity has been continued work on the Frequently Asked Questions guide, a final draft of which will be provided to ACG members at the meeting. This guide has now been updated to include information about the 3.7 μ m anomaly that occurred after the Leonids shutdown, and information about the problems experienced with the visible channels in the GBT products while the auto gain/offset loops were not functioning.

The RAL Project team contributed several articles to the recently published ATSR Special Issue of the Earth Observation Quarterly.

The printed copies of the ATSR flyer have now been supplied to SOC for distribution with the the upcoming issues of the WOCE and CLIVAR newsletters. Several thousand are still available if ACG members can identify other mailing activities we should be targeting. An electronic version of the Flyer was provided to ESA and this was used as the basis of a supplement distributed with the recent issue of EOQ.

Four sets of the ATSR-2/buoy intercomparison data set have been distributed. So far copies have been sent to Jorge Vazquez, Peter Minnett, Bill Emery and Ian Barton. It is hoped that Jorge Vazquez will be able to distribute these data widely in the US through a password protected area of the PODACC web site. Dr. Peter Cornillon at the University of Rhode Island has also been contacted, but pressure of other work may prevent him taking part in the exercise (we are following up on this).

The new ATSR WWW site is on-line, and has been modified throughout the period following feedback received from several users. Feedback from users is very much welcomed.

3.2 WP 2000 IN-FLIGHT OPERATIONS

3.2.1 WP 2100 System Management

The software, hardware, and data links necessary to support the ATSR-1 and 2 instruments have been maintained throughout the period.

3.2.2 WP 2200 Instrument Operations

ATSR-1

ATSR-1 was routinely in hibernation with the IRR off and the DEU supporting MWR operation. The IRR was re-activated on the 24/25th January and its FPA cooled down very well. Adjustments were made during this period that brought the 12micron data on-scale and showed the channel to be working well. The health of ATSR was confirmed as good, after 9 years, noting that its 3.7micron channel failed early on. Issues relating to the operation of ATSR during its next re-activation 140 days later were analysed and written up.

On the 7th of March RAL noted that ATSR housekeeping had ceased. ERS-1 had switched down to payload off because of a data corruption in the platform memory. The problem was analysed, confirmed, and reconfiguration started. Apparently unrelated, on the night of 9th March after the last Kiruna pass, ERS-1 suffered a major AOCS failure of the electronics running two of its giros. ESOC took all possible recovery actions at their disposal but with additional platform failures suspected the satellite was unrecoverable. ESA Paris declared the ERS-1 flight mission at an end.

RAL attended an ATSR/ATSR-2 Operations meeting at ESOC on 28th March where this was all discussed.

ATSR-2

The ERS-2 payload including the ATSR-2 IRR was shut down, on the 7th February, at the commencement of the Mono Gyro AOCS software In-Flight Commissioning. On the 10th February with early tests of the mono gyro commissioning completed ATSR-2 IRR was powered-up, configured and cool-down commenced. Data from the cool down and reconfiguration of the IRR from the 11th January showed that the auto gain/offset loop for the IR channels was not operating as has occurred twice before. An ICU reset on the 14th February did not have the desired effect and the auto gain/offset loop remained frozen. The problem appears as an inability of the instrument on-board software to activate the auto gain/offset loop.

On 21st March after an ICU reset and reconfiguration of the GOME and MWR instruments the IRR start-up began, however this time the auto gain/offset loop (recently frozen after 2 instrument restarts) kicked into operation straight away. The instrument was once again functioning nominally.

Due to an ERS-2 on board detected under-voltage in the Memory Module 2 power supply on the 24th March, the payload was switched to STANDBY. Following IRR start up there were no problems with either the scan mirror start-up or the auto gain/offset loop operation. The instrument is currently functioning nominally.

The latest news page of the ATSR WWW site was updated throughout the period informing users of the on going status of the instrument.

3.2.3 WP 2300 Monitoring

ATSR-1: Basic health and safety check was maintained up to the point when the ERS mission was declared by ESA to be at an end.

ATSR-2: Detailed daily monitoring has been maintained in case the scan anomaly recurs.

There was an increase of 2 degrees in the Scan Mirror Unit temperatures leading to some severe scan jitter in the early hours of the 14th January.

On the 22nd March there was an isolated case of a power spike (61.2w), this caused a number of Pixel 2002 events, after which power consumption and SMU running was nominal.

3.2.4 WP 2400 Troubleshooting and Diagnostics

No Action has been required during this quarter.

3.2.5 WP 2500 On-board Software and High-level Documents

No work required during this quarter.

3.2.6 WP 2600 ATSR-2 X-band EDS development and Maintenance

There has been no work in this reporting period.

3.2.7 WP 2700 Maintenance of the S-Band EDS-1/2

The EDS-2 operation on the ALPHA and the "old" system are both currently operational. The EDS-2 operation has proved successful with no reported problems during the quarter. It is therefore planned to retire the old system in the near future.

3.3 WP 3000 CALIBRATION AND VALIDATION

3.3.1 WP 3100 Calibration and Validation Planning

The situation regarding forthcoming campaigns is under review. Discussions are ongoing and an update of the current situation will be given to the ACG meeting.

3.3.2 WP 3200 Infrared Calibration and Validation

Analysis of all of the SISTeR validation campaigns is nearing completion, analysis reports and validation points obtained will be tabled at the ACG meeting.

SISTeR instrumentation

Work on the instruments has been slow over this quarter, with Tim Nightingale concentrating on analysis of campaign data.

3.3.3 WP 3300 Visible Calibration and Validation

Work on the long term monitoring of the visible channel calibration and the intercomparisons with other sensors continues.

3.4 WP 4000 ALGORITHMS

3.4.1 WP 4100 Algorithm Management

3.4.2 WP 4200 Algorithm Development

Reported under Science support, as the current work relates to improvements in the algorithm coefficients and a review of the cloud algorithm and its performance.

3.4.3 WP 4300 Algorithm Maintenance

Other than those reported above, no significant maintenance activities have been required during this reporting period.

3.5 WP 5000 DATA PROCESSING SOFTWARE

Operational use of the ABT Colocation and Consolidation software (CoCo) revealed a requirements oversight. Unlike other SADIST-2 products, e.g. the ASST, GBT and GSST, the ABT product requires forward-view-only data, found at the end of each raw data file, to be processed and output in the ABT product. This allows full post-SADIST consolidation of the ABT product. The SADIST-2 overall system logic had to be adapted to incorporate the new requirement. An efficient design was planned and implemented. The new forward-view-only data now available required significant extra logic in the CoCo software. A design for this was made and implemented and is now in pre-operational use.

A technical note describing the 3-month cloud-free Drifting Buoy Inter-comparison data set and catalogue has been prepared and is now available.

3.5.1 WP 5100 Software Requirements

There has been no work in this reporting period.

The Core Group is reminded that one main objective of this WP was to consider whether and how to harmonise the ATSR and AATSR data processing systems (SADIST-2 and the AATSR Reference Processor).

The Core Team are asked to consider how to proceed on this matter. The ATSR-series software development team could make a presentation at a future meeting summarising what would be required and the options available.

3.5.2 WP5200 Software Maintenance (SADIST-2 V300)

SADIST-2 V3.21 has now been released and is in operational use at RAL, TSS and the UK-PAF. V3.21 incorporates two important modifications. The first is the ABT-related change for inclusion of forward only data, and the second allows the reflectance channels to be correctly calibrated when ATSR-2 is not in its normal auto-gain/offset mode of operation.

During February/March when ATSR-2 had to be operated with fixed gain and offset, it was noticed that the reflectance channel calibration was anomalous. This was traced to the fact that in this mode auxiliary telemetry data, specifically the mean BB counts, used in the reflectance calibration was erroneous. The algorithm in SADIST-2 was modified to use computed rather than telemetered mean BB counts. The new algorithm was straightforward but had significant knock-on effects related to the data structures and function parameters.

A sequential list of all SADIST-1 version numbers has been prepared which explains the enhancement and/or bug-fix associated with each new version. This list appears now on the ATSR Project Web Pages.

3.6 WP6000 DATA HANDLING

3.6.1 WP6100 Data Management

The State Vector information from ESRIN continues to be received successfully, including simulated year 2000 state vectors which were archived at RAL.

3.6.2 WP6200 Archive Improvements & Population.

LRDAF tapes have continued to be received at RAL. A high level analysis of the 1992 portion of this archive (April-December) lead to ESA supplying some further orbits. There is now only one orbit not present in the LRDAF which had been previously received.

3.6.2.1 WP6201 Data Archive Maintenance.

A full MRF processing run was started with the ATSR-1 data from May 1992 but was suspended when it became clear that there were differences between the processing of the newly supplied data and that previously supplied in LRDTF format. Processing has been suspended whilst this is being characterised. It would appear that the differences arise as a result of inherent differences in the raw data stream and not the processing software. When a more detailed analysis is complete, a report will then be sent to ESA for their comment and investigation

3.6.3 WP6300 Primary Mission Processing.

During this period, the backlog of ATSR-2 processing has been cleared. This had built up as a result of interface problems between the ABF and the Data Processing cluster. Furthermore, the backlog of ATSR requests outside the MRF has also been cleared.

3.6.3.1 WP6301 Browse Population & Operation.

This quarter has seen the ABF clear the backlog of files, ingestion has improved progressively throughout the period. Ingestion by the ABF over the past month has been trouble free.

3.6.4 WP6400 Full Resolution Data Processing for the NERC Community.

The following table summarises data services provided this quarter. Also shown are data services for previous quarter periods for comparison purposes.

	Received	Completed	Outstanding	Products Distributed
1999 Q2	15	11		22060
1999 Q3	11	5		7008

	Received	Completed	Outstanding	Products Distributed
1999 Q4	4	4	10	16312
2000 Q1	15	17	5	22354

Shown below are the statistics provided to DOSTAG.

	GBT	GSST	UBT	ASST	Products Distributed
2000 Q1	14647	7259	21	427	22354

3.6.5 WP6500 Reprocessing.

ATSR-2 MRF processing is currently up to date, there is no backlog.

3.6.6 WP 6600 Order Handling and Distribution

See reports under above work packages.

The following users have requested data during the reporting period

Name	Institute	Country	Requests
Sergey Semovsky	Russian Academy of Science	Russia	1
Gabrielle Seiz	Swiss Federal Institute of Technology	Switzerland	1
Jose Sobrino	University of Valencia	Spain	1
Tom Sheasby	Leicester	UK	1
Aleksei Romanov	Russian federation of research Institute	Russia	1
Thouron Odile	Universite de Lille	France	1
Chris Merchant	University of Edinburgh	UK	1
Dave Smith	RAL	UK	3
John Delderfield	RAL	UK	3
Jack Abolins	RAL	UK	1
Jo Murray	RAL	UK	1
Tim Nightingale	RAL	UK	1
Phillip Watts	RAL	UK	1

Listed below are institutions that have accessed the ASST FTP site

Institution
Meteorological Office
Southampton Oceanography Centre
University of Leicester
ESRIN
School of Engineering of Bilbao, Bilbao, Spain
Russian Academy of Science
Seoul National University, South Korea.

Institution
George Mason University.
Kort & Matrikelstyrelsen, Copenhagen, Denmark.

4. WP 7000 HIGH LEVEL MANAGEMENT

4.1 WP 7100 OVERALL RAL PROJECT MANAGEMENT

Regular progress meetings with the Project Scientist and the EO Data Group Leader have been held to progress work.

5. PLANS FOR THE NEXT QUARTER

The specific milestones for the next quarter are given in Table 3 of the attached progress summary, plus the following list of standing activities:

- Continued operational support for the ATSR-2 instrument.
- Continued ATSR image product service.
- Continued routine ATSR-2 ASST processing.
- Continued routine ABF population and image generation through the Master Request File.
- Continued support for routine ABF operations to users.
- Issue of new CD-ROM