



***AREA TECNICA AVIONICA***

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## **Preliminary Project Design specifications for**

# **G3CARS**

**GPRS Communications Addressing and Reporting System**

## **Description**

What is G3CARS? G3CARS is an acronym for "GPRS Communications Addressing and Reporting System".

Using new Tablet-PC technology with handwriting recognition capability, and connected by the latest generation mobile phone technology, will deliver information between the Aircraft cockpit and the Airline Central Operations. The G3CARS concept is similar to ACARS but at a substantially lower cost and with far more capability and will be based on worldwide recognized software (Microsoft) and Internet interfaces.

G3CARS has been designed to provide airlines with a low risk, low impact method of gradually introducing a range of cockpit communications for the electronic delivery of operational data.

This allows the airline to implement an initial service with minimal outlay and gradually increase the capability as the service is optimised.

The unique aspect of the G3CARS program is that it leverages off the existing Cellular Telephone packet data link, PC Tablet technology and Internet protocols.

Respect to the ACARS the G3CARS, doesn't relay on special SITA stations and the data are in simply format, the connection to GND infrastructure are available everywhere and no special service providers (SITA ) are required, the type of data allowed for transmission are unlimited limited, ACARS has no EMAIL and graphics capability.

G3CARS, is based on existing proven hardware and software platforms, and will be developed and flight tested in conjunction with AirOne.

The Tablet uses existing third party hand writing recognition systems. (i.e. Microsoft Windows XP TabletPC Edition) to input data.

The Tablet doesn't require heavy maintenance installation the costs of equipment are low, the system is easily removable form the A/C particularly if the A/C is not owned by the operator.



## Summary of basic Features

- \_ Electronic delivery of information between crew and company, minimizing the double handing inherent in manual systems.
- \_ Crew can be updated with alerts and procedures in a timely manner via use of the Aircraft Email System.
- \_ Reduce the paper used in the cockpit with the associated manual handling in the process.
- \_ Operations can track aircraft status on a day to day, hour to hour basis due to the nature of the electronic data transfer capabilities.
- \_ Reduce Manual Data Entry
- \_ Reduce Data Entry Errors
- \_ Real time information

## Staged Approach

The G3CARS program will be implemented in 2 development stages.

### Stage 1. Initial Phase

Provides on ground cockpit data communications, reporting and information delivery services, which will improve operational efficiencies and reduce cost.

### Stage 2. Advanced Phase

Automates the update and delivery process of crew manuals, provides interface to aircraft operational systems for data retrieval and subsequent analysis and a deliver system for potential revenue generating functions.

## Stage 1: Initial Phase

### Data Package Submission and Receipt.

G3CARS is designed to be easy for the crew to capture required information electronically and then submit this information back to Airline Operations immediately. The crew would complete the required forms as usual (requiring very minimal product training) and then submit the Data Package through G3CARS Data Submission facility.

The data once received is verified using standard software verification tools methods and then a receipt is issued. Once the receipt has been received, the Data Package is "signed off" internally and cannot be modified. The crew can then continue with operations as normal.

Note: If the data package cannot be verified, it will be resubmitted automatically.



In case of unavailability of network connection, the paper format as today will be used, special number will be issued to allow tracking the paper to allow ground personnel to introduce the data in the system

The Phase One Data Package components consist of the following AirOne required documentation:

- o Graphical QTB Form
- o List of allowable deficiencies (LAC)
- o Graphical Damage Chart
- o Graphical Cabin Deficiencies Log (Cabin log)
- o Cat II/III Approach Form
- o RVSM reports
- o Capitan special reports
- o Ramp information TBD

In the second development phase a possibility to connect the system to standard ACARS IOOO functions will be evaluated and implemented if required.

### **Delivery of TIFC updates to crew.**

Airline information briefs to the Flight Crew are delivered via the CrewMail interface and stored in a repository once received. The CrewMail component recognizes the TIFC and keeps it separate from the standard Crew Mail messages. TIFC Indexing and cataloguing are also performed at the time of reception.

### **AOM, AFM, COM (Manually Updated)**

The system will also host the AOM, AFM and COM manuals in PDF format. Updates will be manually administered. Phase Two (Advanced) provides an automated update facility where the manuals are updated as required.

### **Cockpit Crew Messaging**

The CrewMail feature provides a unique email address for each aircraft (equivalent to every office working station), thereby allowing information pertinent to that aircraft to persist between crews. The system will be limited to AirOne's specific operational email addresses to avoid misuse and will also employ ASI's anti-spam technology to ensure no unsolicited email is transmitted to the Aircraft. ASI's SMS gateway can also be interfaced to allow crew SMS text messages to Airline personnel.

The crew will select the airline email address from a pre-defined list and then complete the Subject and Body sections of the message. No crew attachment capability is provided to ensure the prevention of misuse.



## **Reporting**

G3CARS provides a historical log of all transmissions to and from the aircraft. The Server also logs transactions and can produce detail reporting for reconciliation of billing and usage modelling.

## **Stage 2 – Advanced Phase**

### **AOM, AFM, COM (Download Updateable)**

The AOM, AFM and COM references are updated by scheduled downloads to the TabletPC when updates are made available. Note: The updates will be done regularly to prevent large downloads.

### **Statistical Computations**

Crew captured flight data can be added to the Data Package (Enhanced Data Package) to provide metrics such as Taxi time, flight time, Fuel consumption, Fleet and Component reliability delay codes, and any other information available in the flight log QTB.

### **Quick Access Data Recorder - Downloader**

Gaining access to the Avionics data is simple with the serial interface of the TabletPC and G3CARS Data Downloader. The data collected by MINIQAR can be transmitted at every landing directly to flight safety officer

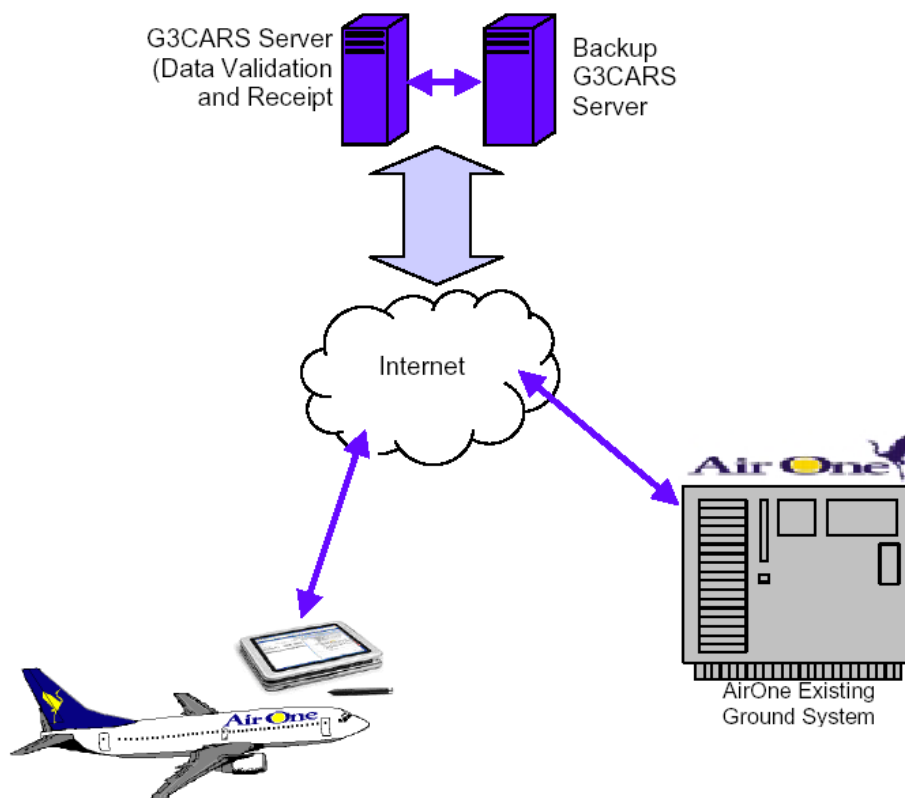
### **Damage Chart Reporting including Digital Photo Capability**

Providing actual photographs of the damage will help the operations team understand the actual requirements for maintenance and repair. This G3CARS Advanced option allows for the import of digital photography from a compatible digital camera to submit with the Enhanced Data Package. (similar to actual MMS technology)



## Summary of Benefits

- \_ Compared to similar old systems is a substantially lower cost (ie. ACARS \$100,000 per aircraft plus SITA)
- \_ Huge data transmission capability at a fraction of the cost.
- \_ Ability to generate revenue to help subsidize the operational cost
- \_ No special communications ground infrastructure required, based on proven reliable Cell Phone Technology the hierarchy of connection will be the following :
  - 1 UMTS
  - 2 GPRS
  - 3 GSM
- \_ Use of protocol "Global connection standard" (Internet)
- \_ Based on current generation technologies (Windows and tablet PC )
- \_ Developed based on AirOne specific needs, no special protocols required, easy to modify
- \_ Remotely controlled and updated
- \_ No skilled people is required
- \_ Data transferable to all windows based application in the company with minimal modification (flight following, financial computation system, crew roster sys and many more)





## **Program Costs**

### **Software Development Costs**

#### **Stage 1. Initial Phase**

Prototype Software Development  
Final Setup (Euro)  
Final System License Fee (Euro)

(one time only for all fleet)  
(one time only for all fleet)  
(setup fee for each A/C)

#### **Support Costs**

From 1.80 to max 2 Euro per aircraft per flight for the items and documents as specified in stage 1

#### **Stage 2 – Advanced Phase**

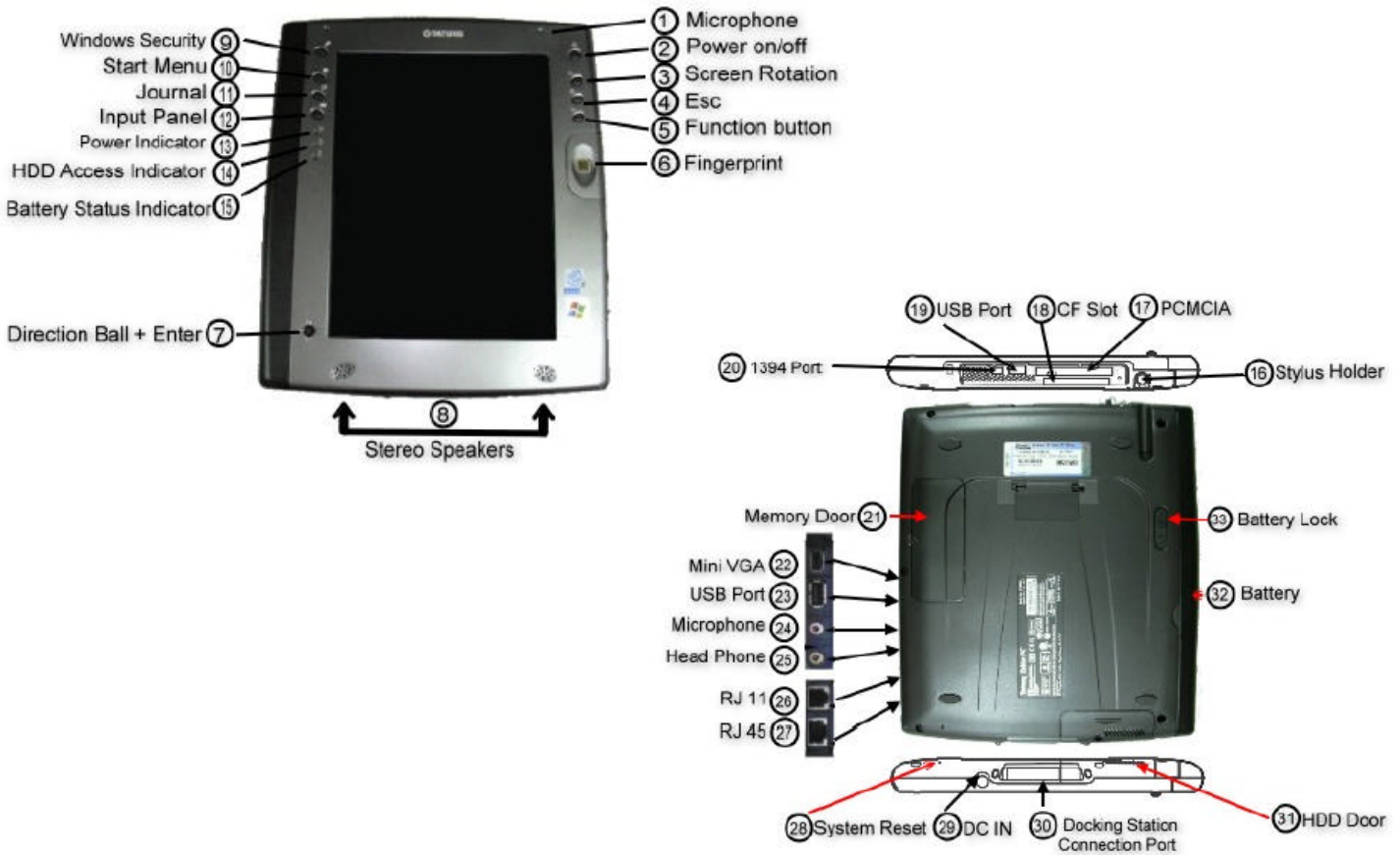
Subject to final specification based on the functions required by Airline

#### **Hardware Costs**

Airone is to procure and provide the necessary hardware to meet the requirements of the G3cars system:

TABLETTE PC suggested (average costs 2000 euro)+ GPRS or UMTS card (350 euro)





## Installation Costs

Pricing does not include installation, which would be at the Airone's expense. De to the nature of the units, the installation will be performed following rules for PED and for non essential equipment, the electromagnetic interference evaluation will be only related to on ground operations. Defined costs will be specified during prototype program.

## Certification Costs

ASI will design the system and assist AirOne in obtaining certification. System will comply with FAA/JAR and ENAC requirements. Certification will be at AirOne expense.

## Cellular Communication Cost

Pricing does not include cellular telephone communication costs, which would be at the Air one's expense. With GPRS service contracts offered by most major telecommunication service providers, the service charge, data costs and initial purchase of the GPRS phone card can be bundled together and charged on a monthly basis. (actually estim. 50 euro for 20 Mb data / month).



## ESTIMATED MILESTONES

### After Proposal Approval

- |  |                                 |
|--|---------------------------------|
| _ Prototype Development and authority acceptance | 6 months                        |
| _ Implementation and Delivery of Initial Phase   | 60 Days                         |
| _ Implementation of Advanced Phase -             | TBD based on required functions |

Documento preliminare di progetto  
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