Fiscal Year:	FY 2013	**Task Last Updated:**	FY 04/28/2014
PI Name:	Beshay, Manal Ph.D.		
Project Title:	Cell Phone-based Lateral Flow Assay for Blood Biomarker Detection		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline--Element/Subdiscipline:	HUMAN RESEARCH--Operational and clinical research		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	(1) **ExMC**:Exploration Medical Capabilities		
Human Research Program Risks:	(1) **Medical Conditions**:Risk of Adverse Health Outcomes and Decrements in Performance Due to Medical Conditions that occur in Mission, as well as Long Term Health Outcomes Due to Mission Exposures		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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PI Organization Type:	INDUSTRY	**Phone:**	310-530-7130
Organization Name:	Intelligent Optical Systems, Inc.		
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PI Address 2:			
PI Web Page:			
City:	Torrance	**State:**	CA
Zip Code:	90505-5217	**Congressional District:**	43
Comments:			
Project Type:	Ground	**Solicitation / Funding Source:**	SBIR Phase II
Start Date:	07/23/2013	**End Date:**	07/22/2015
No. of Post Docs:		**No. of PhD Degrees:**	
No. of PhD Candidates:		**No. of Master' Degrees:**	
No. of Master's Candidates:		**No. of Bachelor's Degrees:**	
No. of Bachelor's Candidates:		**Monitoring Center:**	NASA JSC
Contact Monitor:	Watkins, Sharmi1a	**Contact Phone:**	281.483.0395
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Flight Program:			
Flight Assignment:			
Key Personnel Changes/Previous PI:			
COI Name (Institution):			
Grant/Contract No.:	NNX13CA59C		
Performance Goal No.:			
Performance Goal Text:			
Task Description:	The ability to integrate a sensor platform with a cell phone for health monitoring and disease diagnosis for astronauts in space has the potential to be cost effective and space saving. In this proposal, Intelligent Optical Systems (IOS) builds upon its expertise in lateral flow test strip (LFTS) assays by integrating an LFTS with a cell phone for the quantitative measurement of blood-based biomarkers. Our innovative and extremely cost-effective multi-analyte LFTS approach is eminently suited for space travel. Taking advantage of the built-in flash and high resolution camera, in Phase I we have modified a commercially available cell phone with optical filters, lenses, a UV LED excitation source, and a cassette holder for LFTS image capture. In Phase II, we will expand the capability of cell phone-based LFTS for an antibody-antigen sandwich binding assay to include blood gas measurements by developing sensitive indicator films to be integrated with our cell phone-based detector. Furthermore, we will develop cell phone-based software for on-cell phone detection and data processing with an expanded panel of biomarkers, advancing the TRL from 5 to 7.		

	POTENTIAL NASA COMMERCIAL APPLICATIONS: Future space missions will require prolonged stays of crew members onboard space stations, and on other spacecraft for journeys to other planets. Increasingly complex space missions will also require monitoring the health status of astronauts, preferably in a point-of-care apparatus that is compact and simple. The IOS system will enable NASA to monitor the health status of crew members by means of simple blood-based biomarker detection. A lateral flow test strip will be integrated with a cell phone into a simple and compact blood biomarker detection platform. This platform will gather diagnostic information in the absence of medically trained personnel, and can also monitor the health of aircraft pilots, cabin crews, passengers, and others in aeronautics-related occupations.
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	A cell phone-based serum biomarker detection platform will be cost-effective and compact not only for space exploration; it will also benefit the overall healthcare industry. Cell phones are becoming increasingly prevalent all over the world, with approximately five billion subscribers worldwide, and in the U.S. approximately one in three adults owns a smart phone. The ability to integrate a simple LFTS assay with a cell phone will enable healthcare providers to perform blood tests for many diseases on a wide population, including populations in remote areas where healthcare facilities are sparse. Such a platform can have a major impact in developing countries where a simple cell phone can be converted into a blood marker detection platform, avoiding the cost of acquiring dedicated medical equipment; furthermore, this point-of-care device improves the probability of early detection, yielding additional savings in overall healthcare cost. Military field medicine will also benefit from the availability of a versatile handheld medical blood testing device that takes advantage of the ubiquitous mobile phone to minimize weight and power requirements.
Task Progress:	New project for FY2013. Reporting not required for this SBIR Phase 2 project.
Bibliography Type:	Description: (Last Updated:)