

This white paper examines the opportunities for Congress and the Trump Administration to use existing FAA authority and new management reforms, innovative financing mechanisms and private sector capital—adopting governance models applied successfully throughout the global Air Navigation Service Provider sector—to modernize America’s civil aviation infrastructure.

SENSR - Financing Radar Replacement Using a Spectrum Auction

Tapping \$12 Billion in Private Capital to Launch the Program and Plug the “Gap”

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The White House has identified ATC reform as one of its signature issues primarily because FAA infrastructure modernization needs urgent attention. Aging infrastructure is consuming a growing portion of public spending as the cost to maintain older facilities outstrips the availability of funding to replace them. Radar infrastructure falls under this rubric, and the emerging SENSR modernization program is as important to the Nation’s dual-use technology infrastructure as is GPS. A spectrum auction in 2024 is expected to pay for this multi-billion-dollar program, but SENSR is in a difficult position due to a lack of Congressional funding to support this nationally vital program’s early needs (a funding “Gap”). By not replacing CARSR and ARSR4 radars occupying the spectrum, the prospect of a successful auction remains remote.

This White Paper discusses a “Win-Win” solution that allows for the modernization of America’s military and civil radars, with a simultaneous reduction in operational cost by leveraging a steady stream of private capital and industry know-how. This approach, which we will apply to SENSR using an Innovative Project Financing (“IPF”) model, is consistent with the Administration’s infrastructure funding goals and will result in a net savings of billions of dollars to the federal government and taxpayers, lowering execution risks while expeditiously modernizing safety-critical radar systems for the next 30+ years. A financing syndicate organized by NEXA Capital Partners and Wall Street has offered up to \$12 billion to kickstart SENSR and deliver on the promise.

Background

SENSR is the largest ever Federal Government procurement of radars to modernize the national airspace system, to improve border security, national defense and even weather prediction. The SENSR Program will depend in part upon the public auction of 30 MegaHertz (MHz) in the 1300 – 1350 MHz L-band (“Auctionable Spectrum”) for use by the private sector. SENSR will benefit four government departments and agencies, and FAA has been chosen to manage the procurement process.

Radar infrastructure is the backbone of U.S. air traffic control, national air defense, coastal

surveillance and weather modeling. There are currently hundreds of radar systems across the U.S. that provide for the nation’s needs today (Figure 1). However, many of these systems are decades old, outdated and in need of constant maintenance. They can no longer keep up with the heightened mission.

By acquiring new surveillance solutions, SENSR may result in a consolidation of hundreds of these legacy surveillance radar facilities (e.g., long-range, short-range, and/or weather surveillance) throughout the U.S. and its territories, with a new “system of systems” surveillance capability. New advances in

radar technology, especially phased array radar advances, mean that one new radar can do the jobs of several obsolete radars, allowing the overall number of radar systems to be decreased all the while increasing accuracy and coverage.

SENSR is likely to have this impact on its four agencies and departments:

- Improve FAA’s air traffic management capabilities, including safety elements, and substantially lower the costs of antiquated radar sustainment across the NAS (currently \$266 million per year with direct and indirect costs according to FAA Cost Accounting System (CAS) data provided to NEXA by the FAA Office of the CFO).
- DOD will be able to more effectively monitor and implement homeland defense, civil support and security cooperation to defend and secure the United States and its allies.
- DHS will gain better insights for unmanned aircraft and airspace security operations to provide better response actions for suspicious airborne and maritime activity impacting our nation’s borders.
- NOAA will acquire more accurate and timelier weather predictions with earlier alert time for hazardous conditions (Although NOAA specific requirements were recently removed, NOAA remains an interested SENSR partner).

The Spectrum Pipeline Act of 2015, included as Title X of the Bipartisan Budget Act of 2015 (H.R. 1314), mandates a plan to release spectrum for auction at some time after 2024. Auction proceeds are then expected to cover relocation or spectrum sharing costs, with capital costs expected by industry observers in the range of \$20 billion. A considerable number of radars operating in the auctionable spectrum bandwidth today would ideally vacate the spectrum in time for the auction, to increase auction proceeds.

The Government’s current acquisition strategy includes big funding gaps during all three (3) phases of SENSR deployment, since proceeds from the

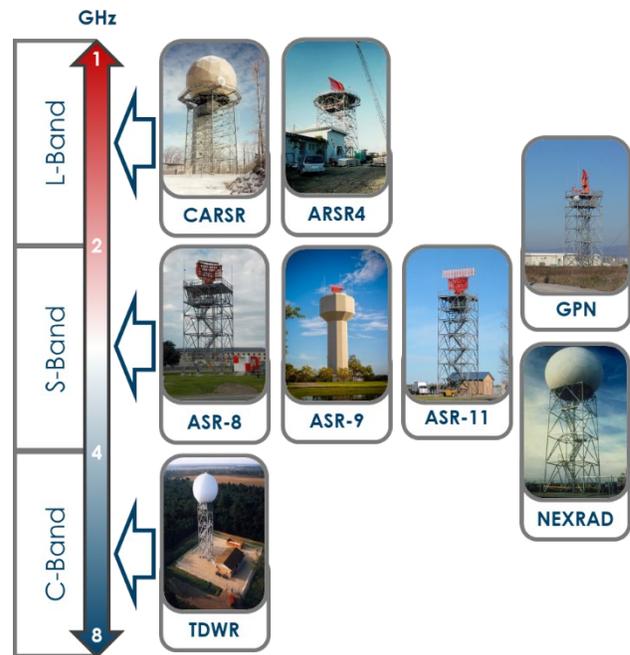


Figure 1 - The 796 Radars Included in the SENSR Replacement Program Include 123 Currently Operating in the L-Band to be Auctioned.

spectrum auction will not come until 2024 or 2025:

- Zero funding during Phase I – total industry investment to a down-select decision in 1Q2019;
- Partial funding during three (3) years of Phase II (Fly-Off), 1Q2019 through 4Q2021 – Government will provide very limited funding for down-selected vendor(s) to develop solution for Fly-Off; and
- Unknown funding during the first three (3) years of contract award, 4Q2021 – 3Q2024, from contract award to receipt of funds from auction.

It is clear that the standard government appropriations process is no way to fund SENSR. Additionally, four years into SENSR, Congress has made only minor appropriations, queasy about placing billions of dollars of funds in the hands of FAA. The large aerospace vendors are both nervous and unwilling to invest their own funds (in sizeable amounts) prior to the spectrum auction. Adding to the overall project complexity, the spectrum auction proceeds are unknown.

Thus, funding gaps and funding sources remain a

huge stumbling block to SENSr, and without addressing them fully in line with AMS policies, the eventual RFP may need to be delayed until funding becomes appropriated or secured through private means.

The imperative for vacating spectrum prior to an auction is one that cannot be denied, and the capital gains that can be realized by the government through a successful auction cannot be ignored. With the added layer of technology-enabled services and potential delay and uncertainty in bandwidth access after the auction date, the SENSr spectrum auction becomes that much more speculative and critical, and one that the government cannot leave to chance. Through an innovative financing structure and solution, the government can maximize the proceeds of the auction while simultaneously mitigating its risk with regards to the technology being replaced and deployed. By endorsing an innovative financing solution and mandating the SENSr contract bidder to deploy private-industry capital to execute on its vision, the government would be able to leverage private-sector efficiencies to their advantage and potentially realize the proceeds from a spectrum auction sooner.

Spectrum Auctions

In 1993, Congress passed the Omnibus Budget Reconciliation Act, giving the Federal Communications Commission (FCC) the authority to hold competitive auctions and solicit bids from qualified organizations to attain licenses for the specific use of certain portions of the electromagnetic spectrum. The FCC has been engaging in spectrum license auctions since 1994, with bidders historically being engaged in network operations or telecommunications. In fact, the FCC has conducted 87 spectrum auctions, raising billions of dollars for the U.S. Treasury, assigning thousands of licenses to hundreds of licensees.

The proceeds of this L-Band auction have the capacity to meet or exceed the \$20 billion mark, comparable to previous spectrum auctions for 5G-

designated bandwidth. But not if the bandwidth is occupied by L-band surveillance radars facing years of reconstruction before vacating for commercial buyers.

Solutions in Private Capital Markets

The private sector has designed innovative financing solutions and IPF mechanisms that enable the governments at the federal and state levels to proceed with complex infrastructure programs, thus reducing risks for both the government and the eventual consortium awarded the work.

NEXA Capital has completed two years of intensive analysis of SENSr and provided financial advice and data to FAA and prospective bidders on the use of innovative financing programs. We submitted a separate financing proposal to the SENSr JPO under the recent RFI process, offering up to \$12 billion to kickstart the design/build effort. Our proposal generated substantial interest inside FAA, DOD and Congress. It has strong backing from Wall Street firms.

Fit With White House Infrastructure Policy

The Trump Administration's goal is to seek long-term reforms on how federal infrastructure projects are regulated, funded, delivered, and maintained. As proposed in this White Paper, the private sector can provide valuable benefits for the delivery of SENSr infrastructure, through better procurement methods, market discipline, and a long-term focus on delivering and maintaining assets.

Innovative Financing Structure

Beginning with Figure 2, we explain the structural mechanics of NEXA's recommended approach, and will assist in explaining the key elements of a specially designed SENSr Project Special Purpose Vehicle (SPV), a type of Public Private Partnership between member stakeholders. An important point is that the structure and procurement elements of the innovative financing structure, including use of an SPV for the purposes outlined, should require no statutory or policy changes under the rules of the

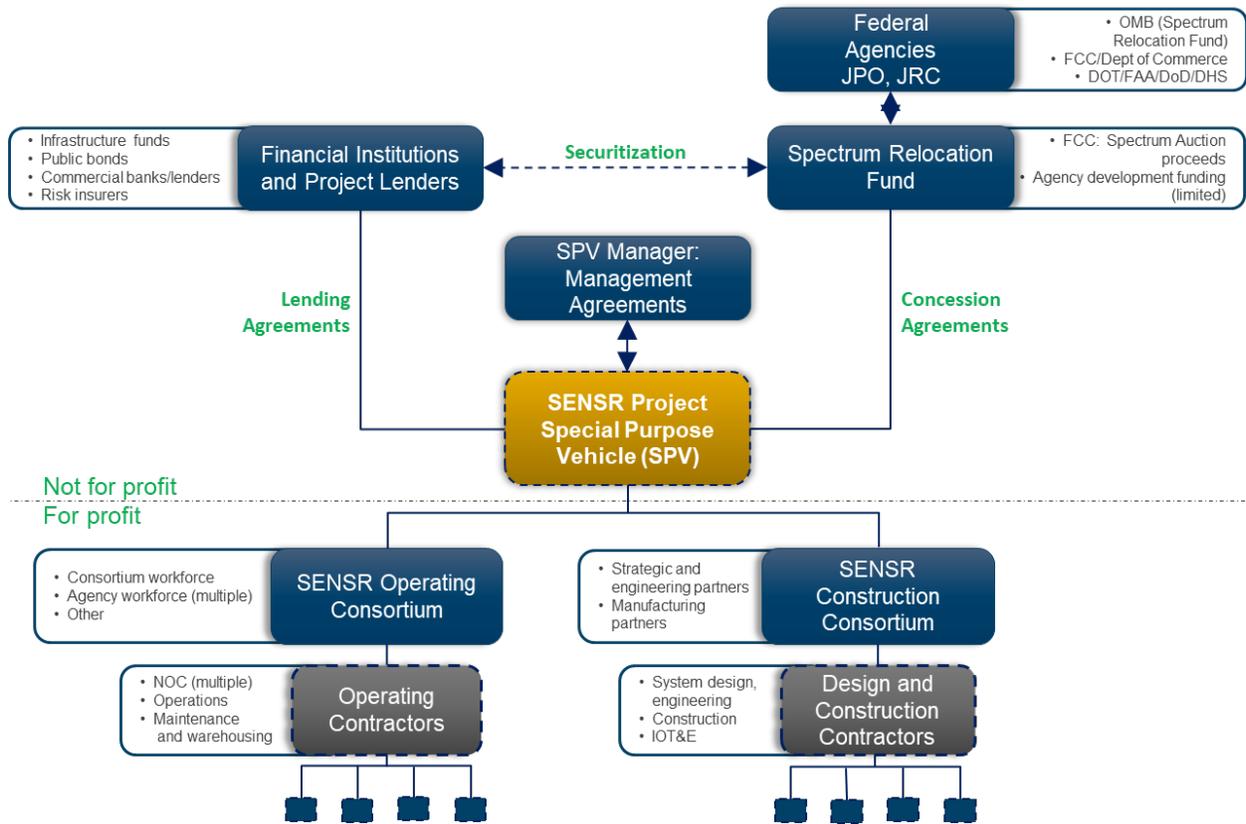


Figure 2 - Innovative Project Financing (IPF) Structure for SENS

FAA Acquisition Management System.

The Special Purpose Vehicle is a non-profit entity whose role is to become the project funding source and borrower of record for SENSR radar replacement in the years prior to the spectrum auction. The SPV borrows funds through bond issuances to lenders that include commercial banks, infrastructure funds and other conventional sources of infrastructure capital. The bonds are issued after being rated by an agency such as Moody’s. Bond securitization is provided by a contractual agreement between the lenders and the Spectrum Relocation Fund which will be the recipient of the eventual auction proceeds.

The future SENSR RFP should produce an award by the FAA to the winning “Build-Operate” consortium, for which the SPV will become a party and the contractual obligant. The terms and conditions of such an arrangement are not unusual, being used in other federal transportation, energy and defense projects, but will be new to FAA.

One of the most important benefits of this approach to Government is that the funds raised by the SPV are multi-year amounts as determined by fixed price costs guaranteed contractually by the winning consortium(s). Because the funds are not subject to vagaries of annual congressional appropriations, SENSR bidders will be expected to offer pricing that they can rely upon and plan for, including such costs as needed factory/production improvements to guarantee efficiencies and savings to the government.

Insuring Auction Proceeds

FAA has raised concerns that the eventual auction proceeds may not be of sufficient amounts to cover the actual costs of modernization of the radars covered under SENSR. NEXA proposes that the auction itself is an insurable event and so has estimated in its analysis that an insurance premium is paid to guarantee that the auction proceeds are achieved at a planned level. This provides a private

sector solution that further mitigates the risks facing the Government.

Taxpayer Benefits

Analytical tools have been developed by NEXA in order to help quantify the impact of various innovative financing approaches on taxpayers. Many scenarios have been analyzed by varying the pace of radar replacement and other factors. Here we discuss benefits of using the IPF and SPV, investing \$12 billion to fund replacement of the radars operating in L-Band only prior to the 2024 spectrum auction date.

Project Execution Savings

We begin with baseline FAA costs: The most conservative assumption on cost is that FAA/DOD continue to maintain and repair the existing radar equipment for 20 years (2016 CAS data obtained by FOIA was used) with the inclusion of currently scheduled SLEP costs and maintenance escalation of 3% per annum. Total is over \$5 billion.

Our taxpayer savings calculations were based upon: 1) Dramatically reduced maintenance cost of new equipment, brought forward by the schedule; 2) Payments from FAA/DOD to the vendors on a “System as a Service” basis, that would begin only when the new radars are operational. The payment amounts would be necessary to repay the OPEX bonds as well as other operational costs borne by the consortium and by government; and 3) Bond interest and bond insurance costs. Here we project taxpayer savings on the order of \$3+ billion.

The analysis did not compare our scenarios with the major risks and cost of a conventional multi-year government procurement of individual radars on a site by site basis (along with annual Congressional appropriations challenges.)

Maximizing Spectrum Auction Proceeds

Based on the document provided by the FAA titled “*Spectrum Valuation Factors Identified by the Technical Panel*”, the Panel estimated that the 1300-

1350 MHz band would have an auction value of between \$14B and \$19B, assuming full vacation of the 50 MHz. If only 30MHz are available for auction, the lower range estimate from the Technical Panel is \$11B. NEXA’s internal estimate based upon interviews with expert spectrum valuers is much higher.

Our financing scenarios were based upon the spectrum auction proceeds that should be sufficient to repay project CAPEX, and our model estimates a conservative premium of \$2.5B+. This \$2.5B figure represents the present value of potential revenues that could be derived from an auction winner (presumably a telecommunications company) over the period when they would occupy the spectrum earlier.

Process to Establish Structured Financing

A step-by-step road map is available from NEXA, and explains how the project consortium and the government can come together to implement the mechanisms of the IPF. The key point with this process is that the IPF structure should become an integral part of the SENS RFP’s requirements. For this to be the case, the RFP would need to direct the consortium to bid its proposal using financing proceeds as outlined. To emphasize the most important benefit of this approach, a guaranteed multi-year funding source of adequate size should permit bidding consortiums to submit pricing proposals confidently on a fixed price basis, with significant programmed savings.

Conclusion

SENSR project costs to government will be substantially higher if funding remains a key unknown or is not assured. If the L-band is occupied during the spectrum auction or the implementation timeline is protracted or at risk, spectrum auction proceeds will not be maximized. Risks (execution, technical, schedule, etc.) to government are currently enormous. In any event, FAA cannot go forward with an RFP until funding is authorized or secured.

Related NEXA White Papers

White Paper No. 12-4: *ATC Reform: The Way Forward*, Michael J. Dymont, Managing Partner, NEXA Capital Partners, LLC and Charles E. Keegan, CEO, Aviation Management Associates, Inc., April 2017

White Paper No. 12-3: *FAA Infrastructure Modernization under the Trump Administration*, Michael J. Dymont, Managing Partner, NEXA Capital Partners, LLC , December 2016

White Paper No. 12-1: *Core Principals of Innovative Financing For Future FAA Capital Programs*, Michael J. Dymont, Managing Partner, NEXA Capital Partners, LLC, November 2012

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Other Reading

Out of Range? The SENSr Program will replace aging infrastructure with modern, state of the art surveillance capabilities, something that will call for novel financing by industry Daniel Hanlon, Aviation Management Associates, Alexandria VA – Air Traffic Management Journal, January 2019
www.airtrafficmanagement.net

The Government Wants to Replace Almost 800 Aging Radar Installations with a New Integrated Solution, Eric Olson, Aerospace Reporter, Electronics 360, October, 2018
<https://electronics360.globalspec.com/article/13024/the-government-wants-to-replace-almost-800-aging-radar-installations-with-a-new-integrated-solution>

Fact Sheet – Spectrum Efficient National Surveillance Radar (SENSR), March 2019
https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=22634